

CHAPTER 11

AIRCREW SURVIVAL EQUIPMENT

INTRODUCTION

Emergency conditions arise quickly and leave little or no time for preparation. You must know what survival equipment is available and how to use it before the need arises.

You can receive aircrew survival training in a number of places. The first place is the aviator's equipment shop, commonly called the "parachute loft" or just the "paraloft." There you will meet the personnel that rig, pack, inspect, and maintain all Navy survival equipment. These personnel are members of the Aircrew Survival Equipmentman rating, and are commonly called "parachute riggers." In the parachute loft, you can get first-hand information on the different items that are covered in this chapter.

The next place is in Flight Physiology. There you will find the medical people who are responsible for survival training. You may have an opportunity to see or even take a ride in the pressure chamber. The pressure chamber allows you to use oxygen equipment under the atmospheric pressure conditions encountered at high altitudes, and to see how your body reacts to those changes.

The multiplace egress device is used in many areas. This device is used to simulate the problems involved in ditching an aircraft at sea, day or night. This training teaches you how to escape from a sinking aircraft and how to use inflatable life rafts and life preservers.

FLIGHT CLOTHING

LEARNING OBJECTIVE: Identify the types, characteristics, and uses of flight clothing.

Naval aircrew protective equipment is designed to meet the extreme stresses of a combat environment. It also provides fire protection, camouflage, and has design features for escape and evasion. The wide range of environmental conditions in which aircraft must operate requires a compromise between comfort and the high level of protection needed. Protection is the first priority. Postcrash fire and cold water exposure are two critical areas where the survival requirements are more important than maintaining the best cockpit

flying conditions. Flight clothing is designed to minimize injury from these hazards.

Aircrew personal protective equipment, such as flight clothing, plays an important role in the safety and survival of pilots and aircrewmembers. It protects personnel from the elements and provides adequate comfort for efficient mission performance. The primary purpose of flight clothing and equipment is to protect you from a variety of hazards. No single item of clothing or equipment can cover all the potential requirements. The Navy uses both general flight gear and specialized protective equipment for protection and comfort in cold and hot climates. General flight gear consists of flight coveralls, boots, gloves, etc.; specialized protective equipment consists of anti-g protection coveralls and antiexposure equipment.

FLIGHT COVERALLS (SUMMER WEIGHT)

The summer weight flight coverall (fig. 11-1), which comes in two colors (sage green and blue), is a one-piece suit made from Aramid cloth. Aramid cloth is a high-temperature resistant, flame retardant, and nonabsorbent synthetic fabric commonly called Nomex. The fabric is lightweight and does not burn, but it begins to char at 700° to 800°F. The suit is fitted by size, easy to put on, has ample pocket space, and is wash and wear.

FLIGHT COVERALLS (COLD WEATHER)

The cold weather flight coverall is a one-piece lined coverall similar to the summer-weight flight suit. The outer layer is a fire-resistant aramid twill with an inner layer of aramid microfiber thermal insulation. The coverall is sized and belted, has a concealed hood in the collar, has ample pocket space, and is wash and wear. The coverall has adjustable sleeve cuffs, front closure and leg zippers make it easy to get in to and provide a snug fit. The coverall is available in 24 sizes and may be worn instead of the summer flight suit when conditions warrant.

FLIGHT BOOTS

Flight boots are designed to protect your feet from high impact forces, such as crushing or piercing. The boots are water resistant.

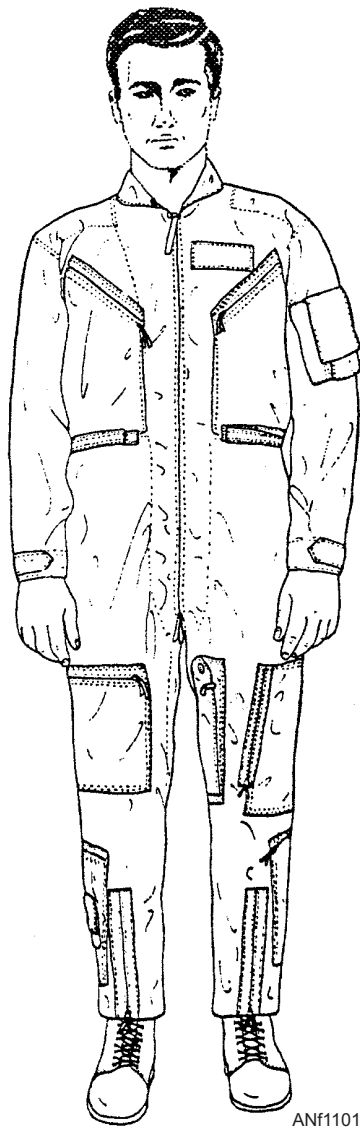


Figure 11-1.—Summer flight coverall.

The upper boot is constructed of black, high-quality calfskin or cattlehide and is lined with soft, full-grain cattlehide glove leather. The boot is 8 inches high when fully laced, and is available in normal shoe sizes. The traction tread soles and heels are made of nonslip, nonmarking, jet-fuel-resistant rubber. The steel box toe is constructed of cold-rolled carbon steel to provide safety through greater compression resistance.

FLIGHT GLOVES

The fire-resistant flight gloves provide protection in the event of fire in the aircraft. The flight gloves are snug fitting to allow maximum finger movement and sense of touch. The gloves do not interfere with operation of the aircraft or use of survival equipment. The gloves are constructed of soft gray cabretta leather and a stretchable, sage green, Aramid (Nomex) fabric.

The fabric (top) portion of the glove does not melt and will not support combustion. The leather palm and finger portions of the glove provide a nonslip surface even when wet.

HELMETS

The type of aircraft you are in dictates whether or not you have to wear a protective helmet. Fighters, attack planes, and helicopters usually require you to wear a protective helmet throughout all flight operations. Other aircraft may require you to wear a helmet only during takeoffs and landings.

The helmet is part of a pilot's protective equipment. Maintenance and upkeep is the responsibility of the Aircrew Survival Equipmentman. There are several different types of helmets. Each has its own specific function. Some types of helmets can be changed or modified to meet certain requirements for specific aircraft and mission. The HGU series helmets are discussed in the following text.

The HGU-68(V)/P series helmets (fig. 11-2) are designed for all tactical fixed-wing aircraft applications. They are lightweight and provide face, eye, hearing, and head protection when properly assembled and fitted to the person. The helmet assembly houses the visor, liner, and communications headset. Some

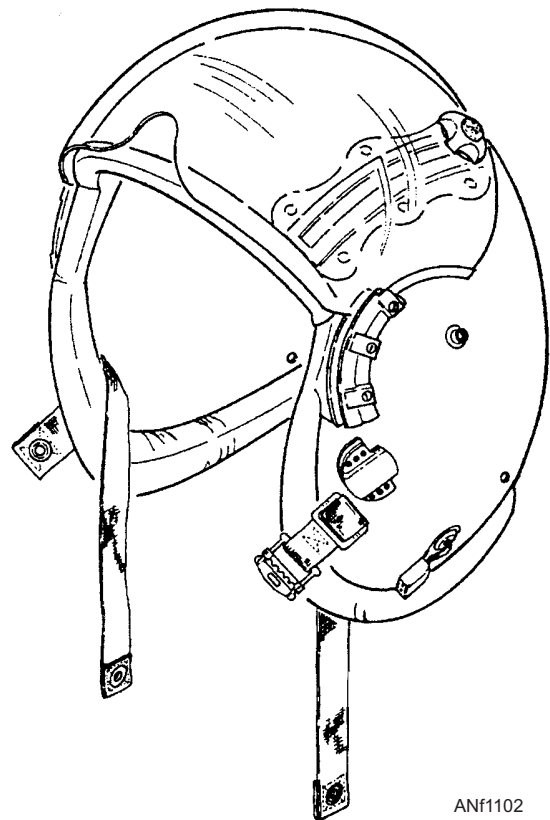


Figure 11-2.—HGU-68(V)/P helmet assembly.

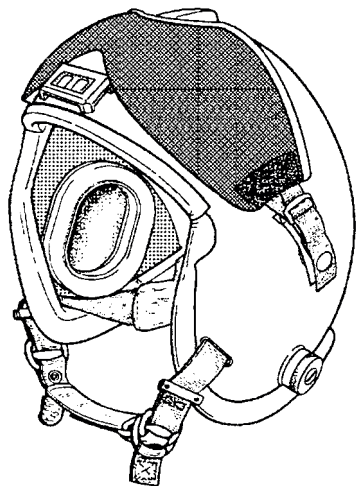
helmets have specialized features, such as the Visual Target Acquisition System (VTAS), Night Vision Goggle (NVG) assemblies, laser protective lenses, sonar operator binaural cables, and boom microphones.

The HGU-84/P series helmet (fig. 11-3) is designated for used by all helicopter aircrew members. Helmet assemblies feature a lightweight shell constructed of a multi-layer mixed composite of graphite fabric and ballistic nylon fabric, an inner foam liner, three integrated visor assemblies (Neutral, Clear, and Laser Eye Protective), communication cord set, boom microphone, earphones, and a integrated chin/nape strap. The helmet provides maximum face, eye, ear and head protection and comfort when properly fitted to the wearer. The HGU-84/P helmet is available in four sizes, (M, LG, XLG, XLG wide) and can also be fitted with specialized features for aircraft or mission.

ANTI-G COVERALLS

When in flight, the body can have trouble adjusting to stresses produced by rapid changing of speed or direction. In situations such as seat ejection, ditching, or parachute opening shock, the short duration of the excessive force has little effect on the body. However, changing the direction of flight produces stress forces equal to several times the normal pull of gravity for much longer periods of time. These longer duration forces can have dangerous effects.

At 5 g's (5 times the force of gravity), the aircrewman's body is exposed to a force that increases its weight 5 times. This increased weight has many effects. Your body is pushed down into your seat. Your arms and legs feel like lead, and operation of equipment becomes more difficult. The extra weight on your internal organs causes stomach and chest pain. Most important, however, is the effect on your circulatory system.



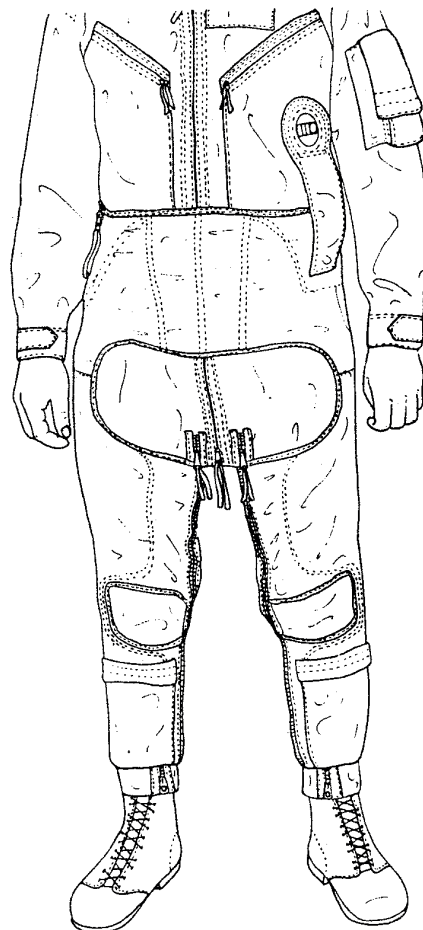
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Figure 11-3.—HGU-84/P series helmet.

At 5 g's, your heart cannot pump enough blood to your head. When this happens, you will pass out. Wearing anti-g coveralls will help prevent this from happening.

The Navy uses two models of anti-g coveralls (commonly called "G" suits). These coveralls provide protection against blacking out, loss of vision, and lowered mental efficiency caused by high g-forces experienced in high-performance aircraft. Figure 11-4 shows a typical anti-g coverall.

Anti-g coveralls compress your legs and stomach to prevent blood from pooling in your lower body. This increases your stress tolerance an average of about 2 g's. Without an anti-g coverall, you may be able to withstand about 4.5 to 5.5 g's without losing vision or blacking out. With a coverall, you can withstand 6.0 to 7.0 g's. This protection is available only for sustained accelerations of 4 to 5 seconds. Anti-g equipment does not offer protection in snap maneuvers where 10 to 12 g's are applied in about 1 second. Such extreme forces for a short time are not as harmful to the body as are lesser forces sustained for a longer time.



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Figure 11-4.—Cutaway anti-g coverall.

ANTIEXPOSURE COVERALL

Antiexposure coveralls are composed of several garments that protect you against exposure in cold water. The two main coveralls are the constant-wear and the quick-donning. The constant-wear suit consists of a waterproof outer garment worn over a ventilation liner and/or cold weather underwear. Constant-wear coveralls provide additional protection from cold temperatures.

The quick-donning antiexposure coverall is carried in the aircraft and donned only in case of emergency. It consists of a waterproof outer garment equipped with permanently attached boots and wrist and neck seals. An inflatable hood and antiexposure mittens are stowed in the pockets. In case of emergency, the coverall is donned over the regular flight clothing (fig. 11-5).

Either the continuous-wear or quick-donning antiexposure coverall is provided for flight personnel and passengers when there is a significant risk of

crashing in the water, and when any of the following conditions exist:

1. The water temperature is 50°F or below.
2. The outside air temperature (OAT) is 32°F (wind chill factor corrected) or below.

If the water temperature is between 50° and 60°F, the commanding officer of the unit concerned considers the following search and rescue (SAR) factors to determine if antiexposure coveralls should be worn:

1. The maximum probable rescue time. This should be a function of mission distance, SAR equipment, and SAR location.
2. The lowest temperatures that will occur in the mission area during the time period of the flight.

When water temperature is below 60°F and antiexposure coveralls are not required, the flight equipment must include antiexposure and high-

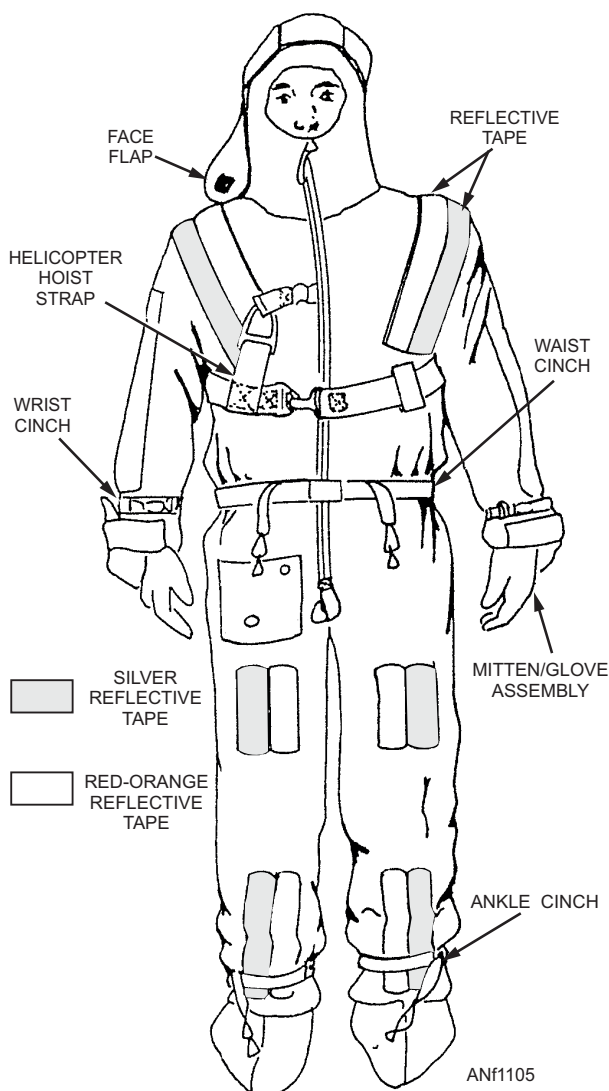


Figure 11-5.—Quick-donning antiexposure coverall.

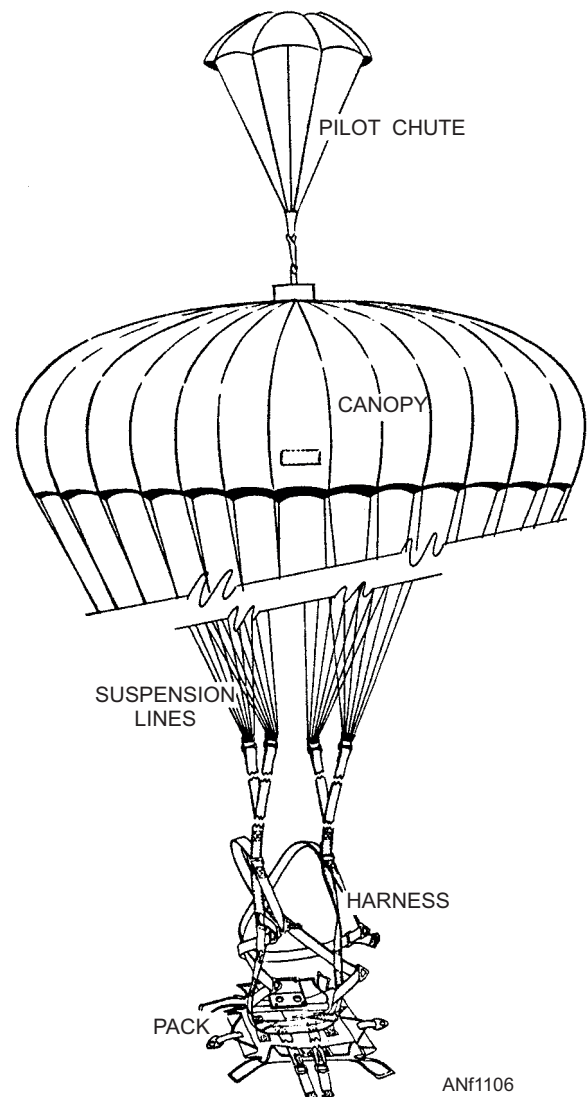


Figure 11-6.—Five major components of a Navy parachute.

temperature resistant undergarments. Wearing double layers of these undergarments can significantly improve your antiexposure protection.

Q11-1. What is the primary purpose of flight clothing and equipment?

Q11-2. What type of helmet is designed for use by helicopter aircrews?

Q11-3. What is the purpose of the anti-g coverall suit?

PARACHUTES

LEARNING OBJECTIVE: Identify the types, characteristics, and basic operating procedures for Navy parachutes.

A parachute consists of five major parts—the harness, container, suspension lines, canopy, and pilot chute (fig. 11-6). The harness is an arrangement of nylon webbing and metal fittings. It is designed to hold the parachute securely to the wearer and provide a seat

or sling during descent. The container encloses the pilot chute, canopy, and suspension lines. The suspension lines are made of nylon and join the canopy to the harness. The canopy is a large round area of cloth that, when inflated, slows the descent of a falling body. The pilot chute is a small parachute attached to the top of the canopy. When the ripcord is pulled, the pilot chute deploys and helps deploy the main canopy and suspension lines.

There are three basic types of Navy parachutes—the Navy back (NB), the Navy chest (NC), and the Navy ejection system (NES).

The NB and NC parachutes are used in aircraft that do not have ejection seat systems. The NES is used in ejection seat aircraft.

NES PARACHUTE

The NES parachute assembly (fig. 11-7) is used only with ejection seat equipped aircraft. The assembly is equipped with a 28-foot canopy. The canopy is

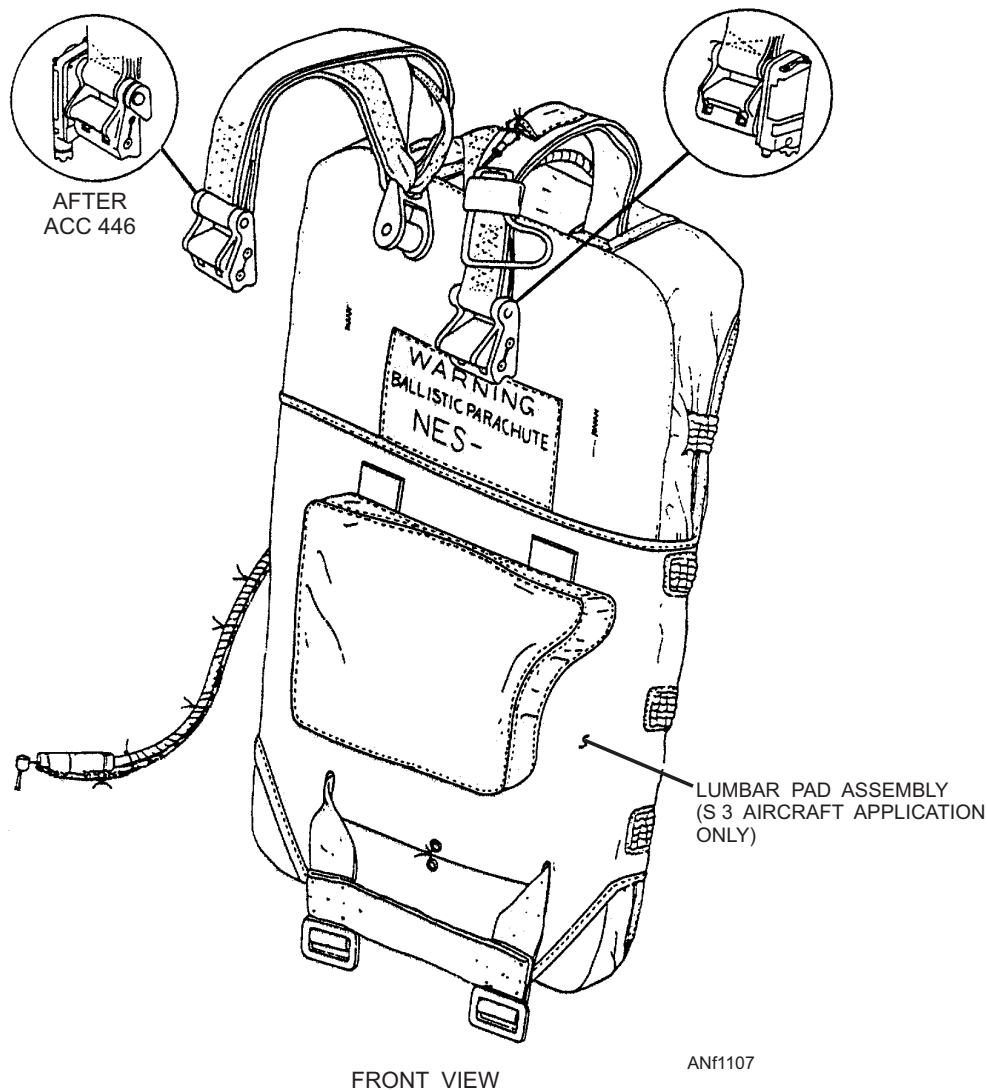


Figure 11-7.—Personnel Parachute Assembly, NES-12.

attached to the aircrewman by lift webs connected to a torso harness. This torso harness is part of the shoulder harness restraint system. The restraint system is part of the ejection seat emergency egress system.

Upon ejection, there are two methods for deploying the parachute. One ejection method is for seats to use explosive cartridge-actuated projectiles to withdraw and deploy the parachute. The other way is for seats to trip an automatic parachute opening device when the ejection sequence separates the occupant from the ejection seat.

The automatic opening device pulls the ripcord pins, which releases the pilot parachute. The pilot parachute, in turn, pulls the main canopy and suspension lines from the container. When full stretch of the suspension lines is attained, a spreading gun attached to the hem of the canopy explodes. The explosion fires 14 projectiles in a centrifugal pattern, which accelerates the parachute opening.

PARACHUTE HARNESES

A parachute harness secures the parachute to the wearer and provides support during the opening shock and descent. The harnesses used by the Navy are the standard quick-fit (used with the NB and NC parachutes) and the integrated torso harness suit (used with the NES parachute).

There are two types of standard quick-fit harness—the back type (NB) and the chest type (NC). The NB type consists of a main sling, lift webs, leg straps, a horizontal back strap, a diagonal back strap, and a chest strap combined into one unit. The lift webs are the attaching points where the parachute suspension lines are attached to the parachute canopy.

The chest type consists of the same components as those of the back parachute. The difference between the chest and the back harness is that the lift webs of the chest harness may be connected to or disconnected from the main sling. This allows you to remove the chest parachute while wearing the parachute harness.

The Integrated Torso Harness Suit

The integrated torso harness suit (fig. 11-8) contains the parachute harness, lap belt assembly, and shoulder restraint harness. The suit provides mobility while restraining the wearer to the seat during emergency conditions. It also serves as a parachute harness during an aircraft ejection.

The suit consists of a nylon webbing harness encased in nylon fabric. It is a sleeveless, legless, torso



Figure 11-8.—Torso harness suit.

garment. Shoulder restraint adjustable straps with quick-release fittings are for attachment of an NES parachute assembly. A lap belt and quick-release adapter are attached to the lap belt alignment webbing. The lap belt assembly is used to attach a survival kit. A webbing belt at the waist area is used to attach a life preserver if the survival vest is not used. A zipper located in the front closes the suit. An adjustable chest strap provides for the final chest adjustment. The strap is secured by a friction adapter and hook-and-pile tape (Velcro). A gated D-ring is attached to the right shoulder adjustable strap near the quick-release fitting. The D-ring is used to attach a helicopter rescue hook.

Parachute Container

The parachute container holds and protects the pilot chute, main canopy, and suspension lines. There are many container designs. Each design is unique to its specific aircraft egress system. Containers are either made from nylon fabric or a contoured plastic frame enclosed in a nylon cover.

Suspension Lines

Suspension lines are the lines that connect the parachute canopy to the parachute harness. The suspension lines form a net or skeleton for the canopy. This skeleton absorbs much of the parachute opening shock. Suspension lines are made of nylon and are used on all main canopies. Suspension lines consist of an outer covering and several inner cords called the core. The core provides the greater portion of the strength of the suspension lines. The suspension lines run continuously between connector links on either side of the canopy.

Canopy

The 28-foot, rip-stop nylon parachute canopy (fig. 11-9) is commonly used in Navy parachutes. The canopy has 28 sides and a diameter of 28 feet. Each side is called a gore and is made up of four sections of fabric.

This parachute has the following characteristics:

- Each gore section is identified by the letters A, B, C, and D, starting with the bottom section.
- Each section is cut at a 45-degree angle to the center line of the gore. This is called "bias construction," and it provides maximum strength and elasticity.
- The suspension lines are enclosed in the channel produced by the stitches of the radial seams.
- A vent opening in the top of the parachute acts as a relief valve and relieves the high internal pressure within the parachute at the instant of opening. Without this vent, an opening at high speed could tear the canopy.
- The canopy is manufactured in four colored sections of fabric to aid a downed crewman in either concealing or signaling his location. The four colors are white, orange, tan, and green.

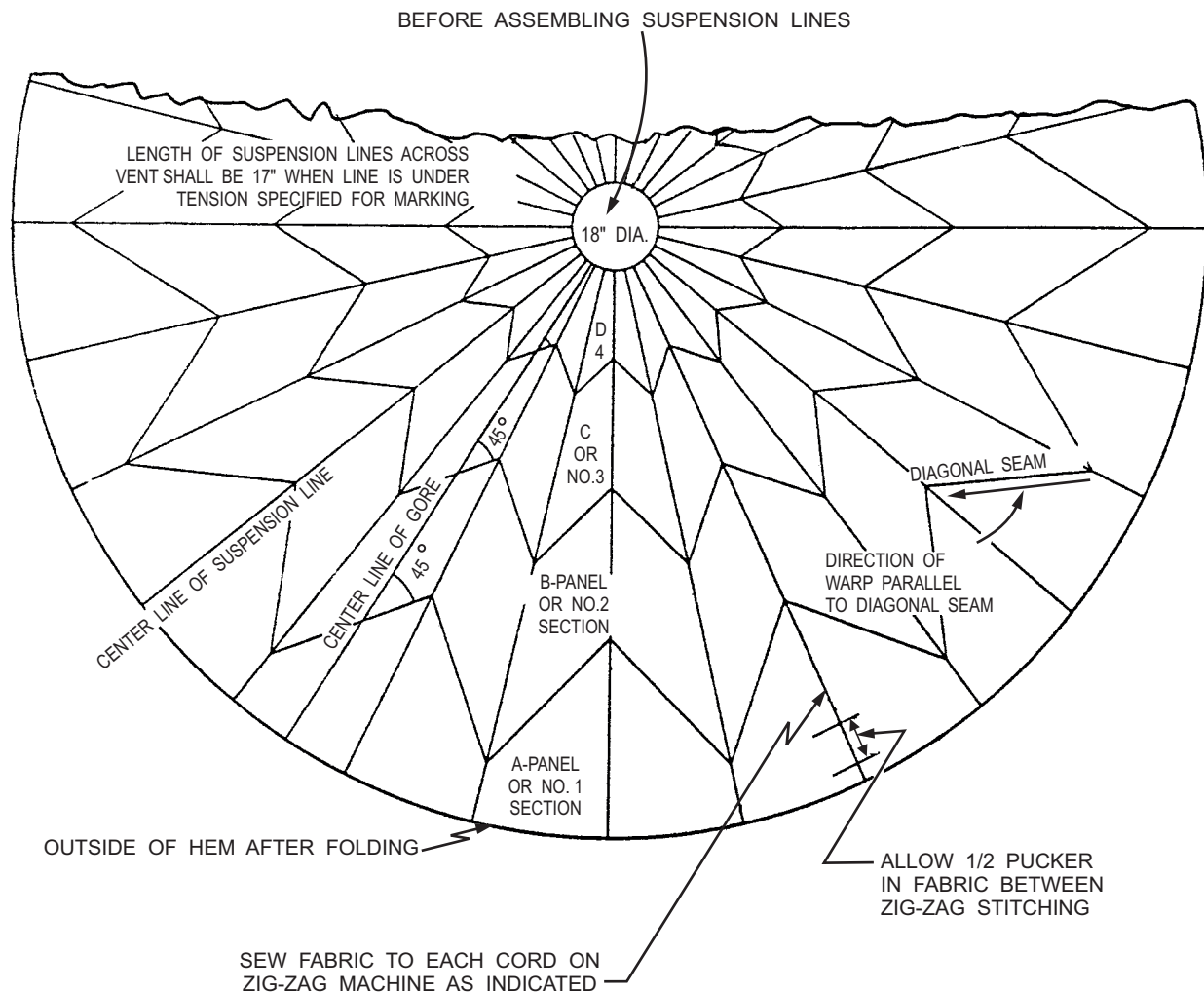


Figure 11-9.—The 28-foot ripstop canopy.

Pilot Chute

The purpose of the pilot chute is to help deploy the main parachute. The vane-type pilot chute (fig. 11-10) is a small spring-loaded chute. It is held in a compressed state by the closing feature of the parachute container. When released from the container, the coil spring will eject the pilot chute into the airstream. The pilot chute canopy inflates and pulls the main parachute canopy and suspension lines from the container.

PARACHUTE HANDLING AND CARE

Anyone whose life has been saved by using a parachute needs no motivation when it comes to taking care of parachutes. Parachutes may seem cumbersome at times, but their bulk should serve as a reminder to those who handle them that the parachute is a lifesaving instrument. The following is a list of handling precautions designed to guide you in the proper ways of caring for a parachute.

1. Do not carry a parachute by its ripcord handle or the lift webs.
2. Keep actuating lanyards for cartridge-actuating devices well protected.
3. Keep parachutes dry and away from all sources of moisture.

4. Keep parachutes away from extreme heat, such as heaters or radiators.
5. Do not drop a parachute.
6. Do not step on a parachute.
7. Keep parachutes clean. Protect them from contact with oil, grease, dirt, acids, and other destructive elements. Acids of any kind, even in weak solutions, are extremely harmful to fabrics. Spillage from aircraft storage batteries often contaminates areas of the deck. This harmful condition has many ways of being transmitted to a parachute. Report immediately any discrepancy noted on the exterior of a parachute.

WARNING

Never hide or attempt to rearrange webbings, material, or actuating lanyards that are disarranged by careless handling. The life you save by reporting these discrepancies might be your own.

Q11-4. What are the three basic types of navy parachutes?

Q11-5. What secures the parachute to the wearer?

Q11-6. Which parachute harness has a gated D-ring attached for helicopter rescue?

Q11-7. What is the purpose of a pilot chute?

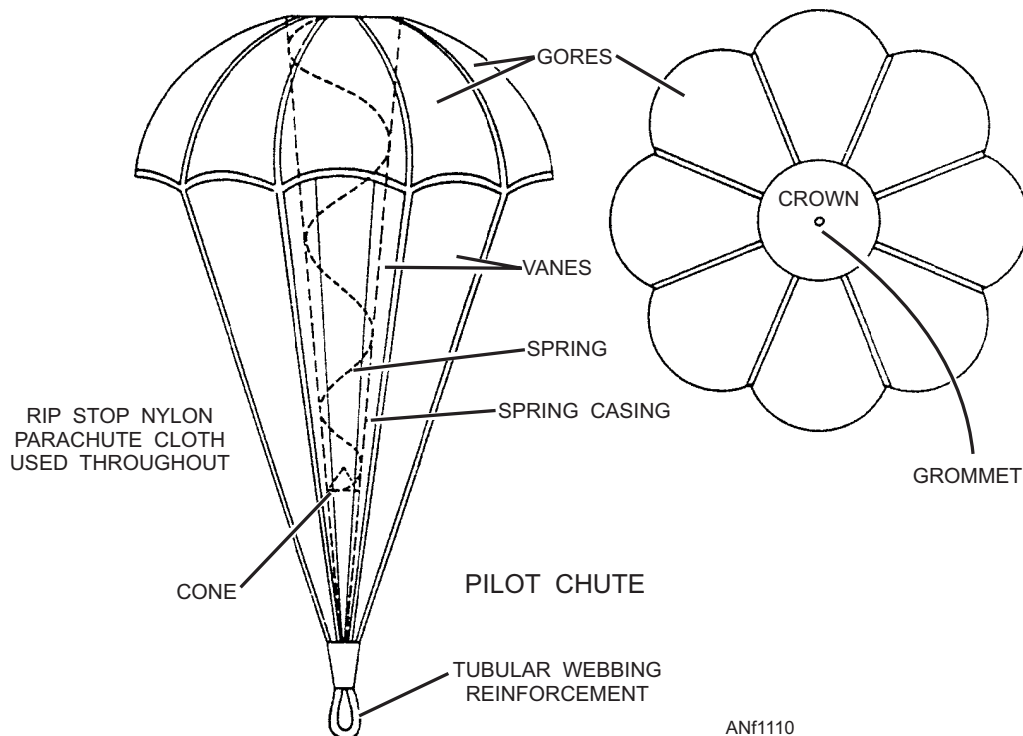


Figure 11-10.—Vane-type pilot chute.

LIFE PRESERVERS

LEARNING OBJECTIVE: Identify types of life preservers and associated survival equipment.

Life preservers are worn by personnel on overwater flights and by flight deck personnel. The life preservers function is to keep you afloat until you can reach a raft or until a rescue team arrives. To prevent malfunction, you must have proper inspection, maintenance, and handling of life preservers.

Life preservers are safe, comfortable, and easy to wear. They provide enough buoyancy to support you if you have to bail out, ditch from an aircraft, or fall off the ship into the water. Life preservers are rapidly inflated

with a compressed CO₂ cartridge. If this fails, they also have an oral inflation device. Accessory survival items may be attached, depending upon the type of preserver.

You must be familiar with the donning, fitting, care, and operation of your life preserver. If you have to eject or ditch, you may spend several minutes or several days in the water. A properly inflated preserver will help you to survive. When you are rescued or reach your raft, keep the life preserver on and inflated in case the raft capsizes or deflates.

LIFE PRESERVER PASSENGER (LPP)

The LPP assembly (fig. 11-11) is used by combat helicopter crews and passengers. The assembly consists of a single-compartment yoke-type flotation

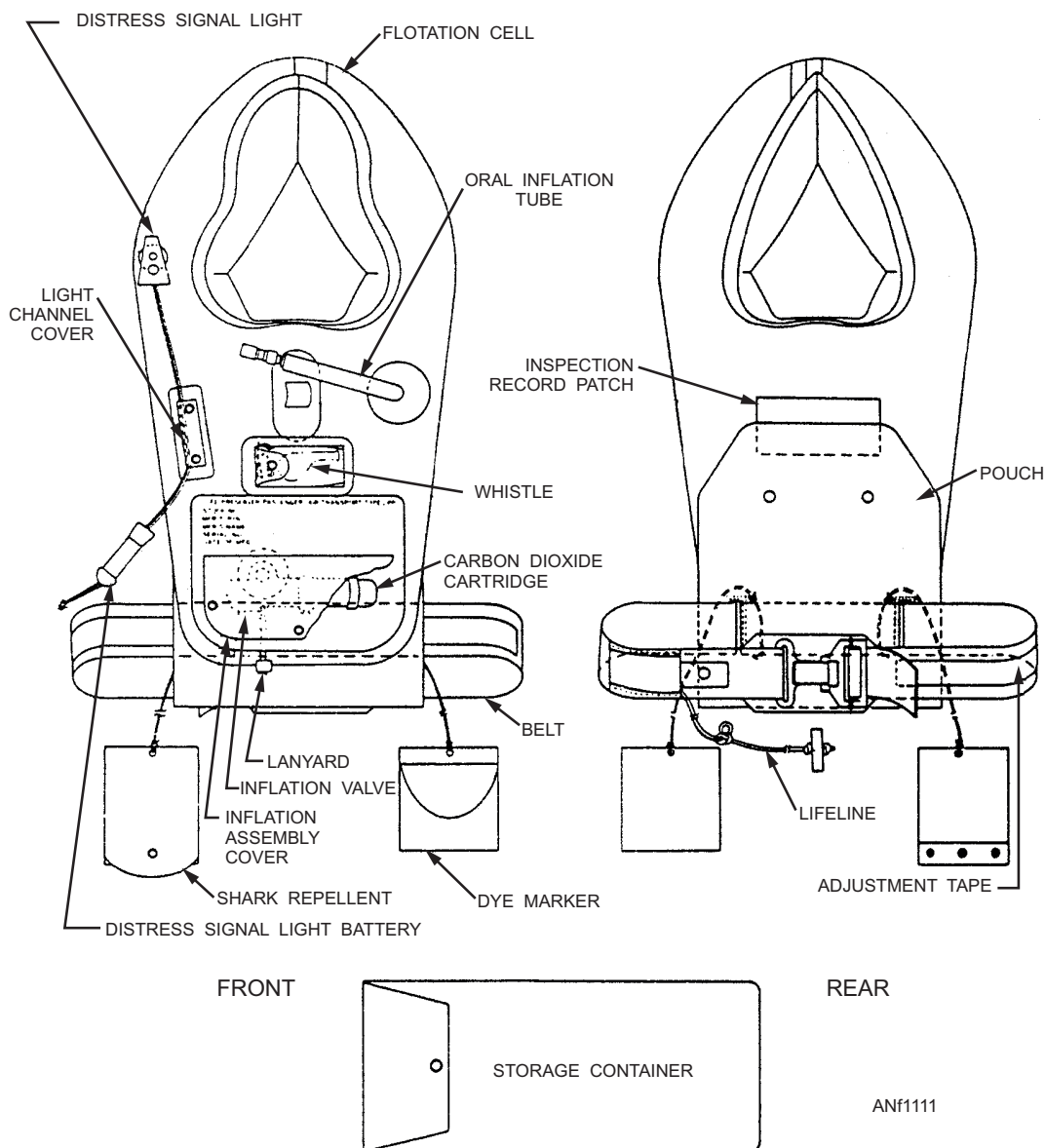


Figure 11-11.—LPP assembly.

bladder, a pouch and belt assembly, a toggle assembly, a CO₂ inflation assembly, an oral inflation tube assembly, and a storage container.

Floatation Assembly

The floatation assembly is constructed of polychloroprene-coated nylon cloth. It has an oral inflation tube, a whistle pocket, and a belt loop.

Pouch and Belt Assembly

The pouch and belt assembly consists of a rubber-coated nylon cloth pouch and an adjustable belt. The pouch contains the floatation assembly and the survival items. The belt consists of a 53-inch piece of webbing, an adjustable buckle and clasp, a toggle assembly, and a toggle assembly pocket. The belt attaches the floatation assembly and pouch to the wearer.

Toggle Assembly

The toggle assembly consists of a wooden toggle and line. The toggle assembly is used to secure survivors together while they are in the water.

Inflation Assembly

The LPP inflation assembly consists of a CO₂ cartridge and an inflation valve. The inflation assembly is connected to the valve stem on the front of the

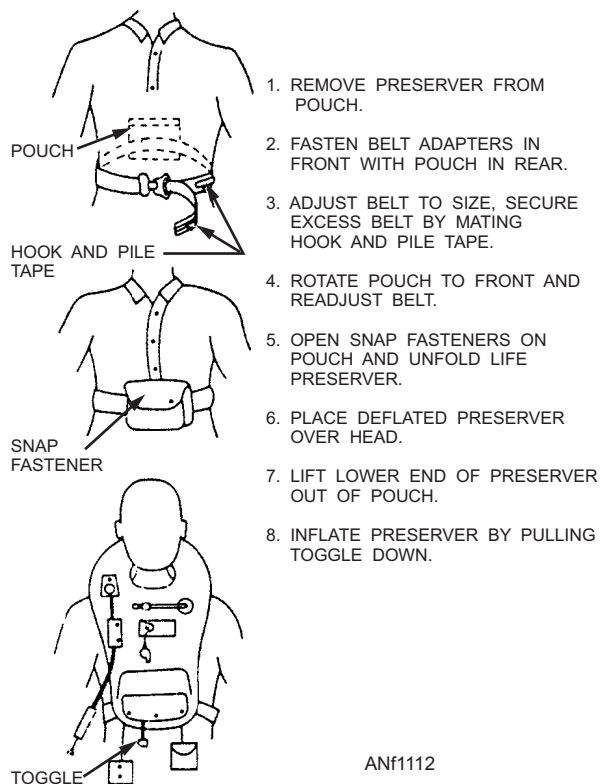


Figure 11-12.—LPP donning procedures.

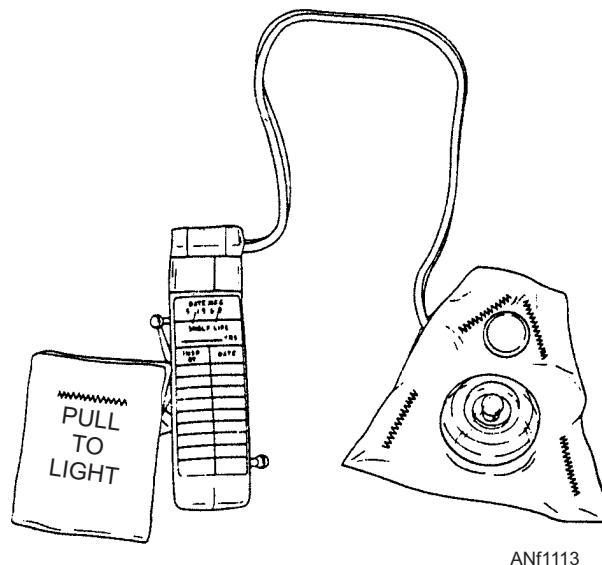


Figure 11-13.—Distress signal light.

floatation assembly. The valve stem is equipped with a check valve that prevents leakage.

Storage Container

The storage container is used to store the life preserver assembly when it is not in use. The storage container has donning instructions printed on it. For an example of these instructions, refer to figure 11-12.

Survival Items

The following survival items are provided with the LPP.

WHISTLE. The signaling whistle is used to attract the attention of rescue ships or personnel in foggy weather or at night.

DISTRESS SIGNAL LIGHT. The distress signal light (fig. 11-13) is water activated. It is used to attract the attention of SAR aircraft, ships, or ground rescue

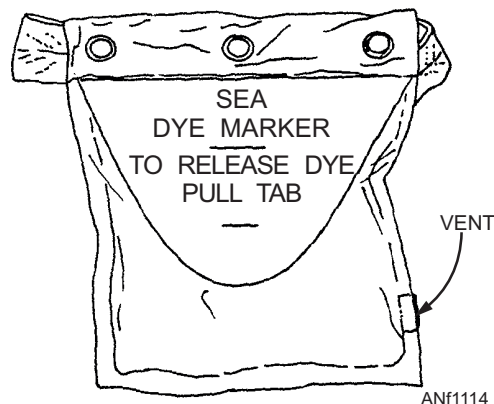
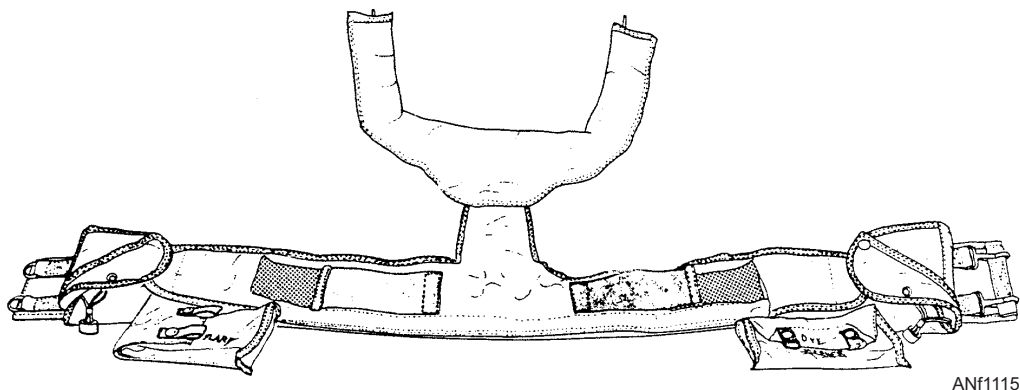


Figure 11-14.—Dye marker.



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Figure 11-15.—LPU life preserver assembly.

parties. The light emits a constant, high-intensity light that is visible for many miles, and it has an operational life of 8 continuous hours. The light is a small, compact unit consisting of a lens, connector wire, and powerpack. The light is attached near the top right side of the flotation assembly to provide maximum visibility. The powerpack hangs below the light to ensure contact with water. To activate the powerpack, pull the "pull to light" plug.

DYE MARKER. The dye marker (fig. 11-14) is a chemical that turns water brilliant green. It is used to attract the attention of rescue aircraft. The dye stays strongly visible for 20 to 30 minutes and may cease to be a good target after an hour, depending on sea state and ocean current. It is visible at an approximate distance of 11 miles at 3,000 feet altitude. If rapid dispersion of dye is desired, agitate the container in the water. To open the dye marker, grasp the material at the top of the packet between the fingers and the palm of the hand. Tear the pull tab.

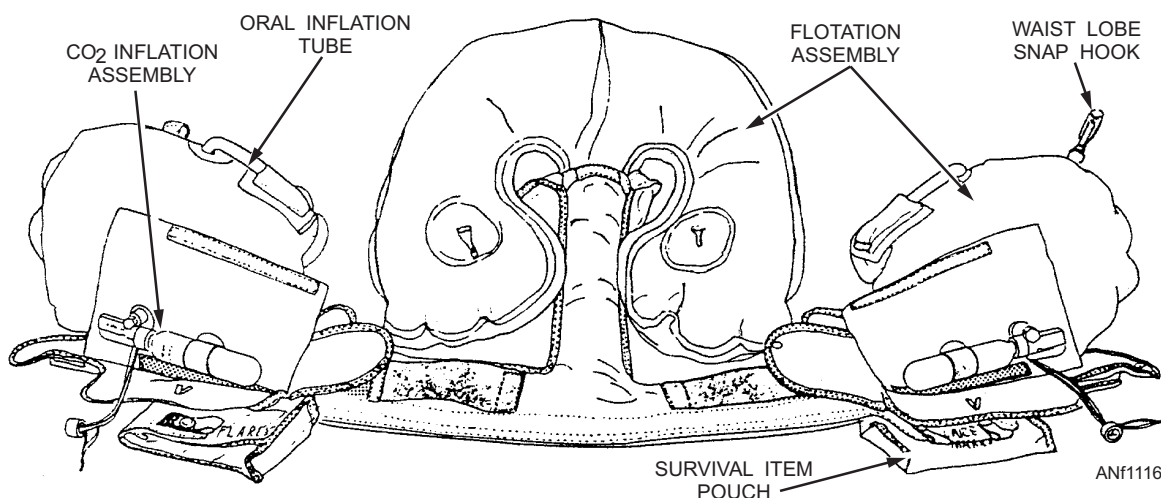
LIFE PRESERVER UNIT (LPU)

The LPU assembly (fig. 11-15) is used by naval aircraft crew members. It is designed as a constant-wear item for use with and attached to the SV-2 series survival vest. It will not interfere with removal of the quick-fit parachute harness. The assembly consists of a two-chambered flotation assembly, a casing assembly, and optional survival items and pouches.

Flotation Assembly

The flotation assembly (fig. 11-16) is constructed of polychloroprene-coated nylon cloth and consists of two independent flotation chambers sewn together at the collar. These chambers are inflated by CO₂ inflation assemblies or by the oral inflation tubes on each waist lobe.

Each waist lobe is equipped with an attachment patch used for securing the casing assembly. The right



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Figure 11-16.—Flotation assembly (inflated).

waist lobe is equipped with a snap hook. The left lobe is equipped with a D-ring. The snap hook and D-ring are used to secure the waist lobes together after inflation. Each collar lobe is equipped with a snap hook for attachment to the survival vest.

Casing Assembly

The casing assembly is constructed of rubber-coated nylon cloth and protects the flotation assembly. The casing assembly consists of the adjustable casing, an adjustable webbing belt, and the front connector assembly. The webbing belt keeper loops retain the webbing belt. They also allow attachment of the survival vest around the wearer's waist.

Survival Item Pouches

The survival item pouches attach to the lower casing assembly with snap hooks. The pouches contain two dye markers and two Mk 13 Mod 0 or the Mk 124 (day/night) distress signal flares. Carrying the survival item pouches is optional; however, when the pouches are not used, the dye markers and flares will be contained in the SV-2 series survival vest.

FLIGHT DECK INFLATABLE LIFE PRESERVER

The flight deck inflatable life preserver (fig. 11-17) is NOT a piece of aviation survival equipment. It must NEVER be substituted for an LPP or LPU life preserver. The flight deck inflatable life preserver is worn by all flight deck, aviation maintenance, and ordnance personnel. This preserver is mandatory flight deck safety equipment.

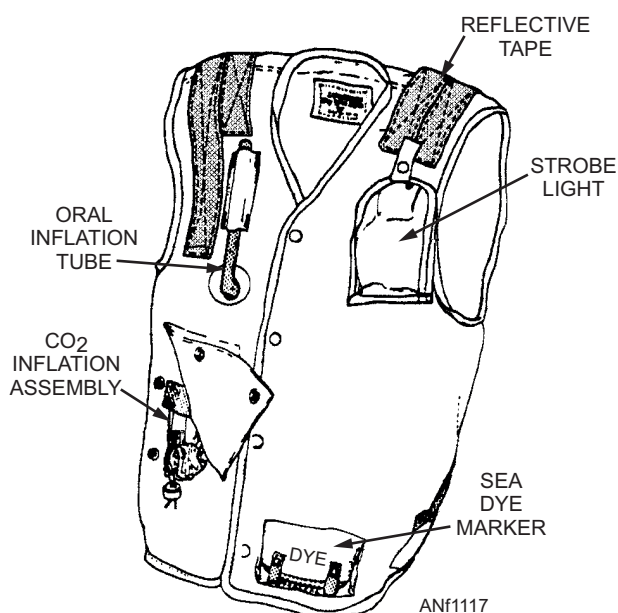


Figure 11-17.—Flight deck life preserver.

The flight deck inflatable life preserver is a two-piece unit that consists of a single-compartment inflatable bladder and a cloth outer garment.

The inflatable bladder is inflated by pulling the toggled lanyard that is attached to a dual CO₂ inflation assembly or by an oral inflation tube. Overinflation is prevented by a pressure-relief valve diaphragm. The bladder will support 29 pounds of buoyancy.

The cloth outer garment is constructed of cotton fabric. It is available in a variety of colors used to identify the carrier/flight deck personnel occupational fields. Cloth reflective tape is sewn to each shoulder area to aid in the location of a wearer at night. Each vest is equipped with pouches that contain a distress light marker, whistle, and sea dye marker.

The shipboard Planned Maintenance System (PMS) contains maintenance and inspection requirements for the flight deck inflatable life preserver.

Q11-8. How many ways can the LPP life preserver be inflated?

Q11-9. How many pounds of buoyancy will the flight deck life preserver support?

Q11-10. What is the purpose of the different colors for the flight deck life preserver?

LIFE RAFTS

LEARNING OBJECTIVE: Identify the types of life rafts and common survival kit items.

Naval aircraft that make operational flights over water are required to carry enough life rafts to carry all the assigned crew plus passengers. Life rafts are manufactured in various sizes and configurations to meet the demands of all types of aircraft.

Pneumatic life rafts are compact assemblies that can be stowed in a small area. They should be stowed so they are easy to get to, preferably near an emergency exit. Never stow a life raft under other equipment or cargo or near batteries. Protect them from sources of heat such as heaters, engines, auxiliary power units, and electronic tubes.

If the aircraft flight manual designates a storage place for rafts, this space should be used. Whenever possible, stow rafts in the same places in all aircraft of the same model. This allows new crewmen to know the location of the rafts, and thus avoid confusion in the event of a ditching situation.

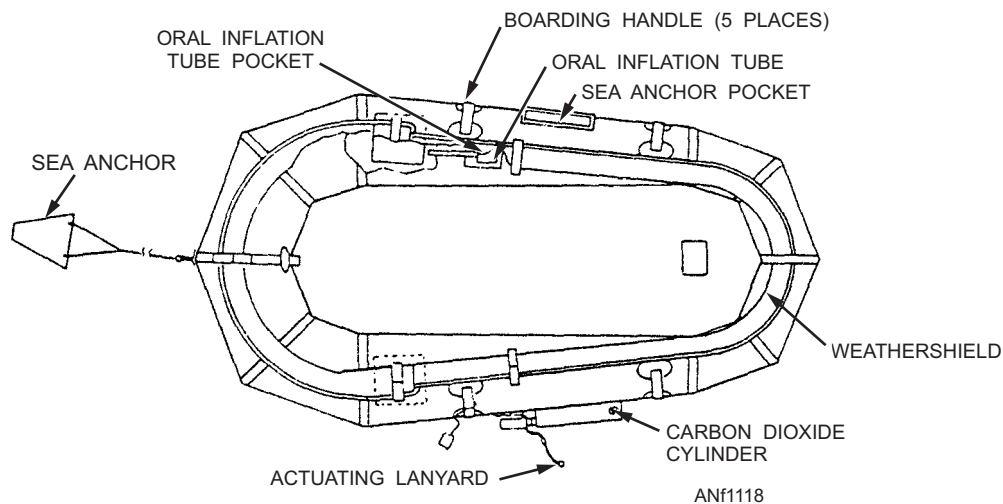


Figure 11-18.—One-man life raft assembly.

Life rafts are constructed of various types of rubberized, rubber-coated, rubber-impregnated, or nylon cloth.

Life rafts can be damaged by abuse. However, when afloat at sea, rafts are surprisingly strong, durable, and stable. The Aircrew Survival Equipmentman (PR) is responsible for inspecting, packing, and maintaining life rafts and related equipment carried in an aircraft.

ONE-MAN LIFE RAFT

The one-man life raft (fig. 11-18) is a single compartment flotation tube with a non-inflatable floor used with various soft and hard types of survival kits. This life raft is intended for use by aircrew members forced down at sea; however, it can also be used when forced down over land for fording down rivers and streams or as a shelter.

Emergency survival equipment is provided with the life raft when it is used with the rigid seat survival kit (RSSK) in a parachute/ejection seat egress system.

The life raft can be inflated manually or automatically. The survivor can pull the CO₂ inflation assembly actuating lanyard or the raft will automatically inflate when it is released from the RSSK. You may top off inflation by using the oral inflation tube.

One-Man Life Raft Container

The one-man life raft container is designed so that the life raft and survival items can be secured to the parachute and ejection seat system. This container is called a rigid seat survival kit (RSSK).

The RSSK (fig. 11-19) is a two-part container. It has a separating type hinge and a release handle assembly that secures the two containers. The upper

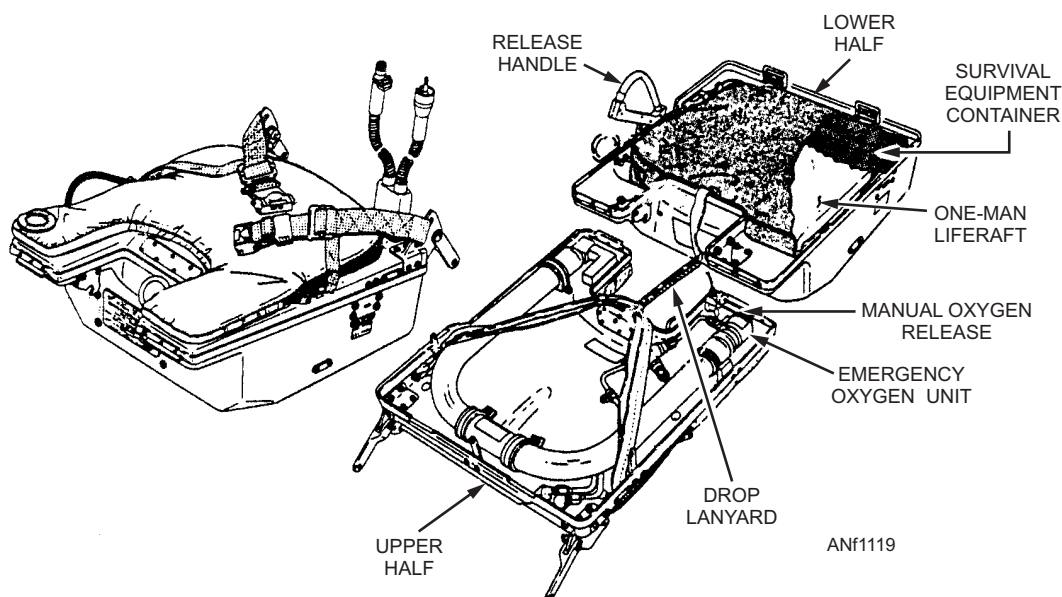


Figure 11-19.—Rigid seat survival kit (RSSK).

half of the container houses an emergency oxygen system and incorporates the lap belt retention assembly. The lower half contains the one-man life raft and survival equipment container. The life raft is released, during parachute descent, by pulling the release handle. The lower half of the container drops away under the weight of the raft and equipment. A drop lanyard is attached between the upper and lower containers. The lanyard automatically inflates the raft and equipment to the upper container. The upper half of the RSSK stays attached to the survivor.

Survival Items

The life raft and many of the survival items supplied in the RSSK (table 11-1) have already been described. Only those items that have not been covered are described in the following paragraphs.

Table 11-1.—Life Raft and Survival Kit Items

DESCRIPTION	QUANTITY REQUIRED
Dye Marker	2
Distress Signal (Day/Night) Mk 124 Mod 0	2
Survival Radio or Beacon	1
Code Card	1
Canned Water 10 oz.	1
Opener, Can, Hand	1
Nylon Cord, Type I, 50-Foot	1
SRU-31/P Kit	1
Bailing Sponge	1
Space Blanket 3 oz.	1

BAILING SPONGE.—The bailing sponge may be used to catch rainwater, to bail a raft, for personal hygiene, and for other purposes under survival conditions.

NYLON CORD.—The 50-foot length of 110-pound test nylon cord is provided for securing items to the raft and for a fishing line.

COMBAT CASUALTY (SPACE) BLANKET.—The space blanket (fig. 11-20) is 84 inches long by 56 inches wide and weighs 3 ounces. The blankets are either orange/silver or olive drab/silver colored.

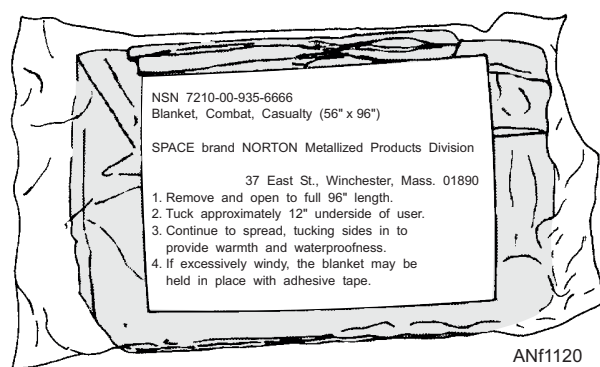


Figure 11-20.—Combat casualty (space) blanket.

The blankets are made of aluminized plastic. They provide warmth and protection against the elements, provide signaling capabilities, and some radar reflectivity.

GROUND/AIR EMERGENCY CODE CARD.—

The GND/AIR emergency code card (fig. 11-21) contains aircraft distress signals, aircraft acknowledgments, display signals, and body signals. Use these signals if communications equipment is not operable, no communication equipment is available, or if radio silence is required.

MULTIPLACE LIFE RAFTS

When the crew and passenger capacity of an aircraft make the one-man life raft impractical, multiplace life rafts have been provided. The CO₂ inflated multiplace rafts are made in four sizes. They are equipped with provisions to support 4, 7, 12, or 20 people for 24 hours.

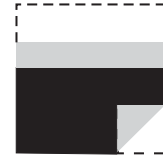
Multiplace life rafts are stowed in the wing, engine nacelle, and outside fuselage compartments. They are automatically inflated and ejected when the compartment door is released. The life raft is tied to the aircraft by a breakable painter line. Droppable life rafts are carried inside the aircraft. They are inflated only after being removed or dropped from the aircraft. To inflate the life raft, pull the inflation assembly actuating handle located on one end of the carrying case.

The 4-, 7-, and 12-man life rafts are similar in design. Only the 7-man and the 20-man rafts will be discussed in the following paragraphs.

LIFE RAFT PAULIN SIGNALS

NOTE - Solid lines = blue. Dotted lines = yellow.

The pilot of the rescue plane will answer your messages either by dropping a note or by dipping the nose of his plane for the affirmative (yes) and fishtailing his plane for the negative (no).



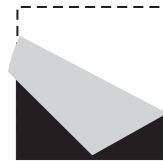
Have abandoned plane.
LAND - Walking this direction.
SEA - Drifting.



LAND - Need quinine or atabrine.
SEA - Need sun cover.



LAND - Need warm clothing.
SEA - Need exposure suit or clothing shown.



LAND and SEA - Plane is flyable. Need tools.



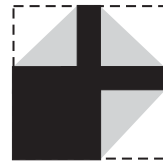
SEA - Need equipment as indicated. Signals follow.



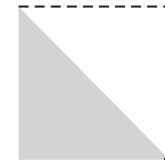
LAND - Need gas and oil. Plane is flyable.



LAND and SEA - Need medical attention.



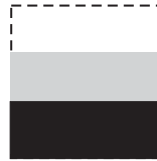
LAND and SEA - Need first aid supplies.



LAND and SEA - Need food and water.



LAND - Indicate direction nearest habitation.
SEA - Indicate direction of rescue craft.



LAND - Should we wait for rescue plane?
SEA - Notify rescue agency of my position.



LAND and SEA - O.K. to land. Arrow shows landing direction.



LAND and SEA - Do not attempt landing.

BODY SIGNALS



Need medical assistance - Urgent. Lie prone.



Do not attempt to land here.



Land here. (Point in direction of landing.)



All O.K. Do not wait.



Can proceed shortly - Wait if practicable.



Our receiver is operating.



Use drop message.



Need mechanical help or parts - Long delay.



Pick us up - Plane abandoned.



Affirmative (Yes)



Negative (No)

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Figure 11-21.—The GND/AIR emergency code card.

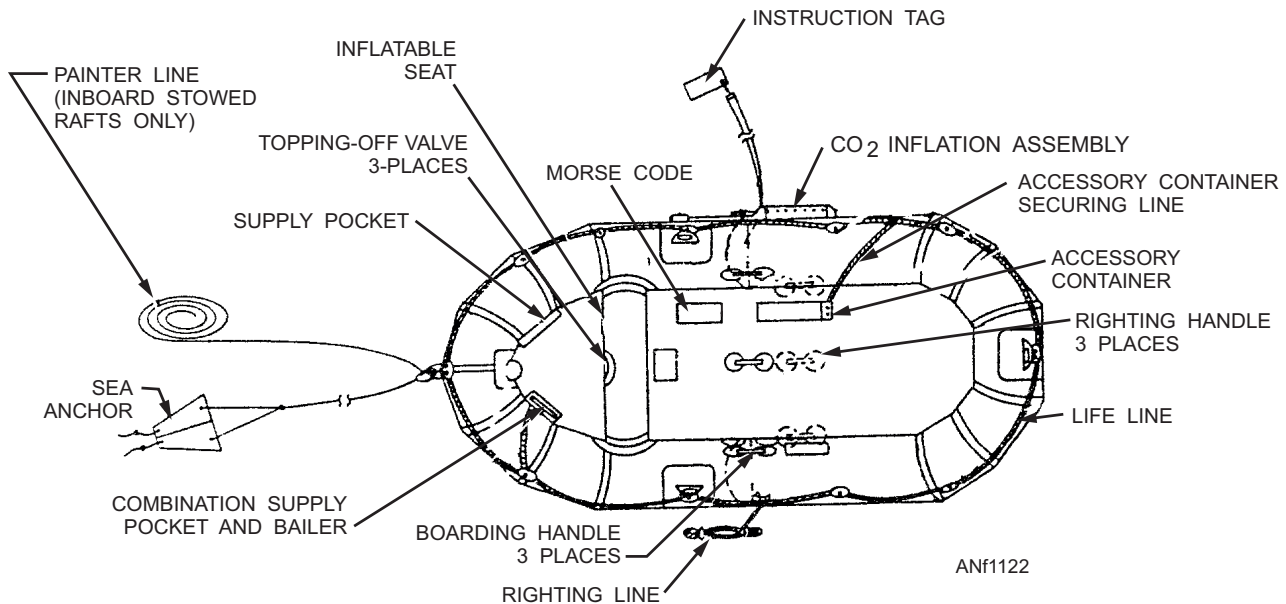


Figure 11-22.—Seven-man life raft assembly, parts nomenclature.

The Seven-Man Life Raft

This life raft (fig. 11-22) consists of a two-compartment main tube, an inflatable seat, a non-inflatable floor, and a sea anchor. The CO₂ inflation assembly inflates the two main tubes. A lifeline and a combination supply pocket and bailer are attached to one of the main tubes. A righting line and an accessory container securing line are attached to the lifeline. Survival items are stowed in the accessory container (table 11-2) and in the supply pocket and bailer (table 11-3). Boarding handles and righting handles are attached to the main tube and floor.

Table 11-2.—Seven-Man Life Raft Accessory Equipment

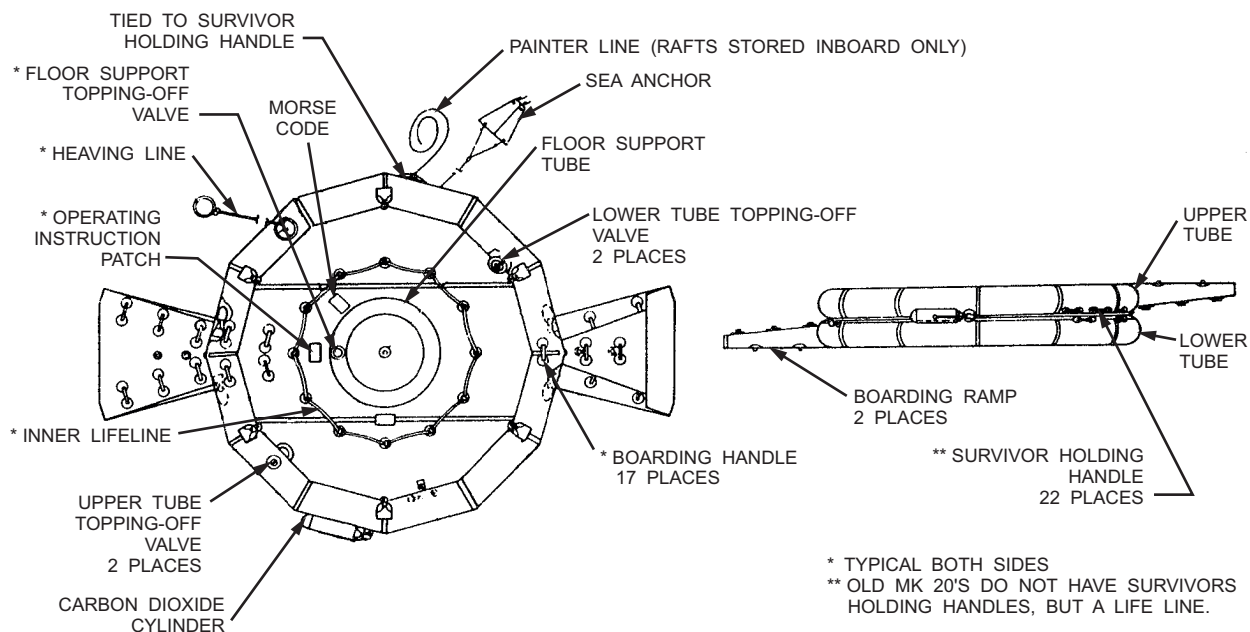
COMPONENT OR SURVIVAL ITEM	QUANTITY REQUIRED
<u>Packed in Accessory Container</u>	
Dye Marker	4
Distress Signal (Day/Night) Mk 124 Mod 0	6
Water Storage Bag	3
Canned Water (10 oz.)	7
Opener, Can, Hand	1
First Aid Kit	1
Sunburn Ointment	1
Rations	7
Bailing Sponge	1
Hand Pump	1
Space Blanket (12 oz.)	1

Table 11-3.—Seven-Man Life Raft Supply Pocket Survival Items

COMPONENT OR SURVIVAL ITEM	QUANTITY REQUIRED
<u>Packed in Supply Pocket:</u>	
Flare Gun	1
Signal Light (Strobe)	1
Signal Light (Steady Burning)	1
Signal Mirror	1
Survival Radio or Beacon and Battery	1
Code Card	1
Whistle	1
Compass	1
Pocket Knife	1
Nylon Cord, Type I, 50-foot	1

The Twenty-Man Life Raft

The 20-man life raft (fig. 11-23) consists of two single-compartment circular tubes connected by an equalizer tube, a non-inflatable floor suspended between the circular tubes, and a boarding ramp permanently attached to each tube. The floor has a built-in inflatable floor support. A sea anchor, used to retard drifting, is stowed in a pocket at the junction of the circular tubes. An inner lifeline, boarding handles, a heaving line, and accessory equipment are also provided, as shown in table 11-4.



Anf1123

Figure 11-23.—Twenty-man life raft assembly parts nomenclature.

Table 11-4.—Twenty-Man Life Raft Accessory Equipment

COMPONENT OR SURVIVAL ITEM	QUANTITY REQUIRED
Signal Mirror	1
Dye Marker	6
Whistle	1
Code Card	1
Distress Signal (Day/Night) Mk 124 Mod 0	10
Space Blanket (12 oz.)	3
First Aid Kit	1
Sunburn Ointment	3
Rations	20
Water Storage Bag	7
Canned Water (10 oz.)	20
Opener, Can, Hand	2
Compass	1
Pocket Knife	1
Hand Pump	1
Nylon Cord, Type I, 50-foot	1
Bailing Sponge	2
Survival Radio or Beacon and Battery	1
Flare Gun	2
Signal Light (Strobe)	1
Signal Light (Steady Burning)	1
Sealing Clamp	2

A unique design feature of the 20-man life raft is that it is always right-side-up after inflation. The

inflation assembly inflates the circular tubes and boarding ramps only. Topping-off valves are located on each side of the circular tubes and on each side of the floor support.

Q11-11. Where is the one-man life raft located in ejection seat systems?

Q11-12. How many sizes are there for the multiplace life raft?

Q11-13. Which multiplace life raft is always right side up when inflated?

PERSONAL SURVIVAL EQUIPMENT

LEARNING OBJECTIVE: Identify items of personal survival equipment and their uses.

When an aircrewman leaves his aircraft under emergency conditions, survival items provide a means of sustaining life. They also provide a means of attracting the attention of rescuers and, if necessary, of evading the enemy.

Survival items are packed in life rafts and droppable kits or packed and carried by the aircrewman on his/her person.

As a possible aircrewman, you need to know what survival items are available and how to use them. Some survival items have already been covered in the life raft and life preserver sections of this chapter. The following survival items are normally carried by the aircrewman on his/her person.

SURVIVAL VEST (SV-2 SERIES)

The survival vest (fig. 11-24) is designed to provide pocket storage for survival items. It provides attachment places for a life preserver and a chest-mounted oxygen regulator. It does not interfere with use of either the quick-fitting or integrated-type parachute harness.

The survival vest is made of nylon cloth. An adjustable harness, shoulder and leg straps, and an entrance zipper secure the vest to the crewman. A helicopter rescue strap is attached to all survival vests that are worn without an integrated torso suit. When required, a chest-mounted oxygen regulator is located inside a pocket secured to the vest by hook-and-pile tape (Velcro). The survival vest and the survival items are shown in figure 11-24 and figure 11-25. Survival items not previously discussed are discussed in the following paragraphs.

Service Pistol

The service pistol is worn only when mission requirements warrant its use.

Sheath Knife

The 5-inch sheath knife is carried as a general-purpose survival tool. It should be kept clean and sharp.

Individual Survival Kit

The individual survival kit (fig. 11-25) is a two-part kit. It is used to provide medical (Packet 1) and general survival (Packet 2) equipment for a downed aircrewman for about 24 hours.

NOTE: This kit may be omitted from the survival vest when the kit is included in the aircraft survival kit.

Mk 79 Mod 0 Illumination Signal Kit

The signal kit (fig. 11-26) is used for day and night signaling to attract the attention of SAR (search and rescue) aircraft or ground rescue parties. The signal kit consists of a hand-held pencil-type launcher (Mk 31), seven (Mk 80) star flare cartridges that screw into the launcher and a bandoleer for storing the flares. Each flare has a minimum burn duration of about 4 1/2 seconds and can be launched up to 250 feet producing a 12,000 candlepower red star.

Signaling Mirror

The emergency signaling mirror consists of an aluminized reflecting mirror glass, a back cover glass, and a sighting device. Personnel can use it to attract the attention of passing aircraft or ships. It reflects light either in sunlight or in hazy weather. Mirror reflections can be seen at distances three to five times farther than a

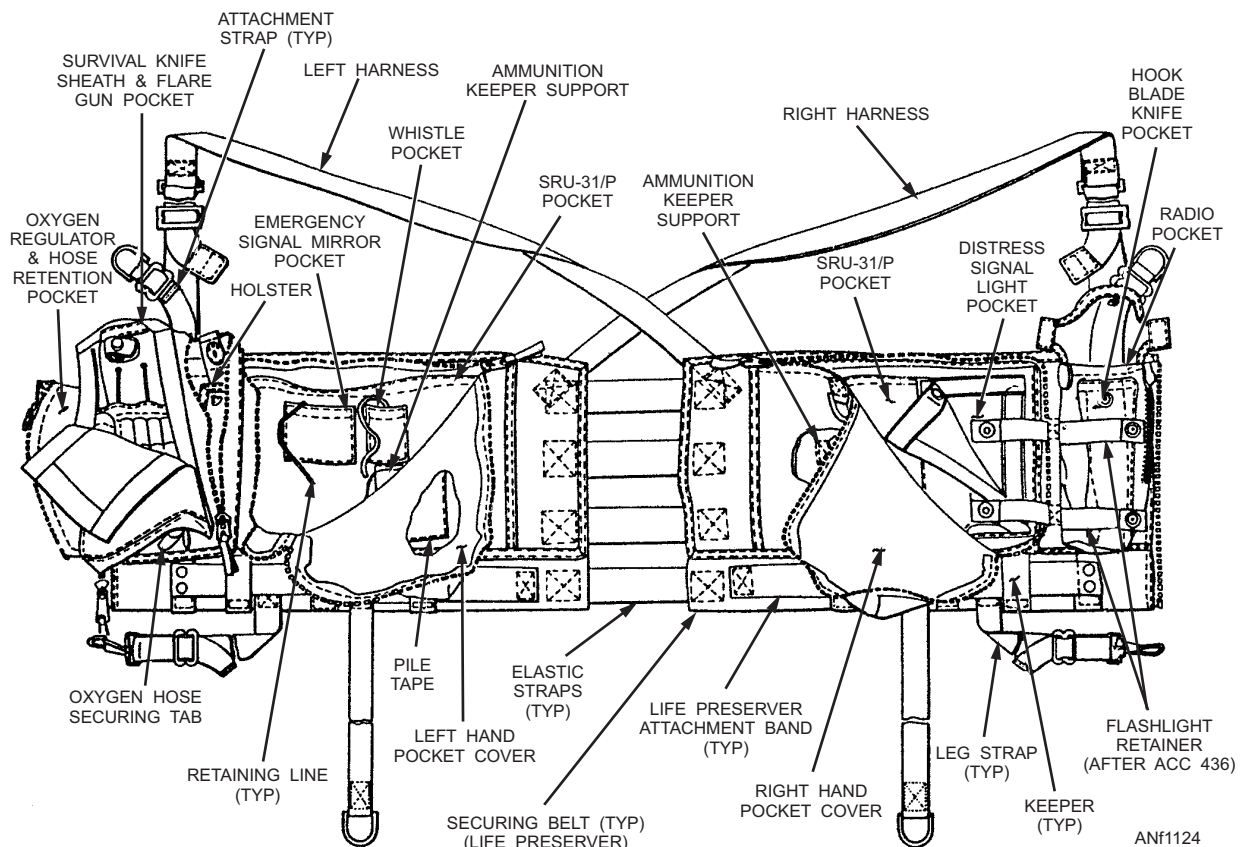
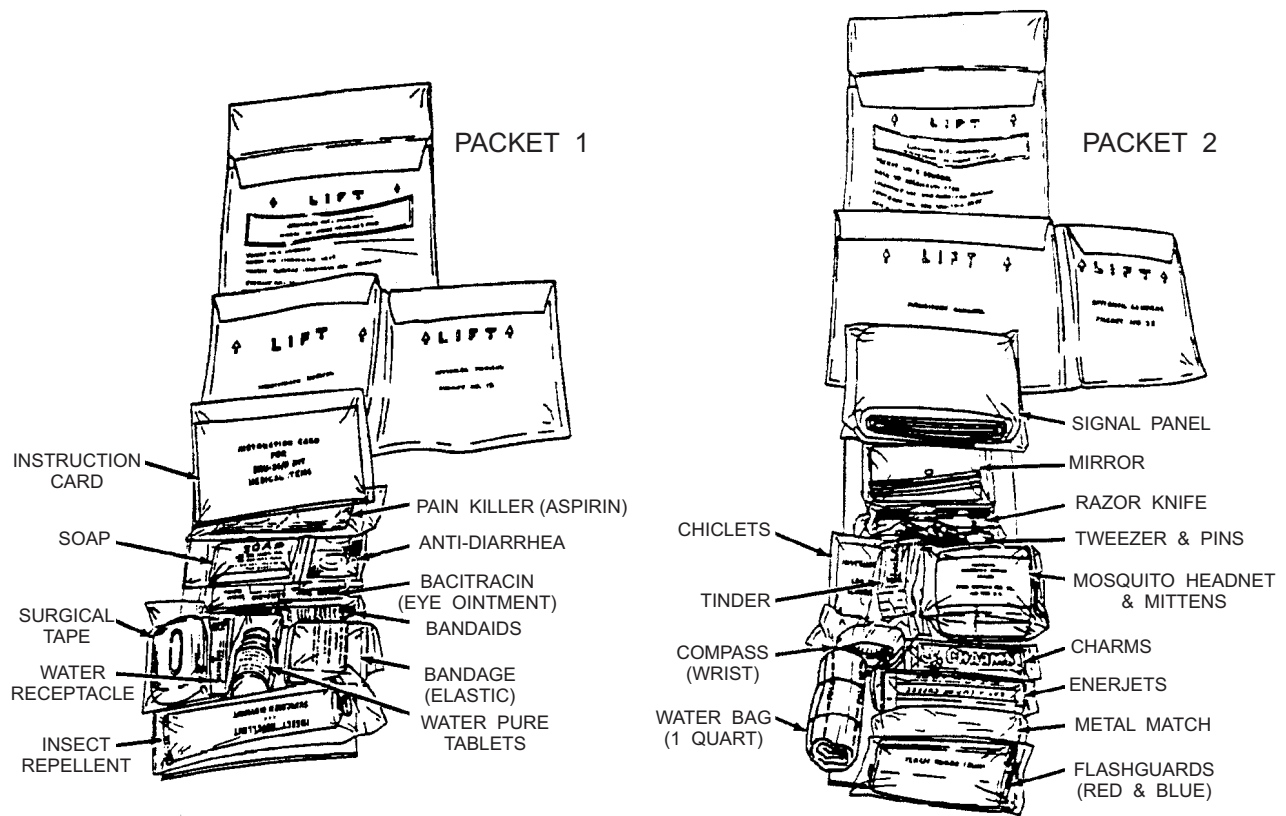


Figure 11-24.—Survival vest (SV-2 series).

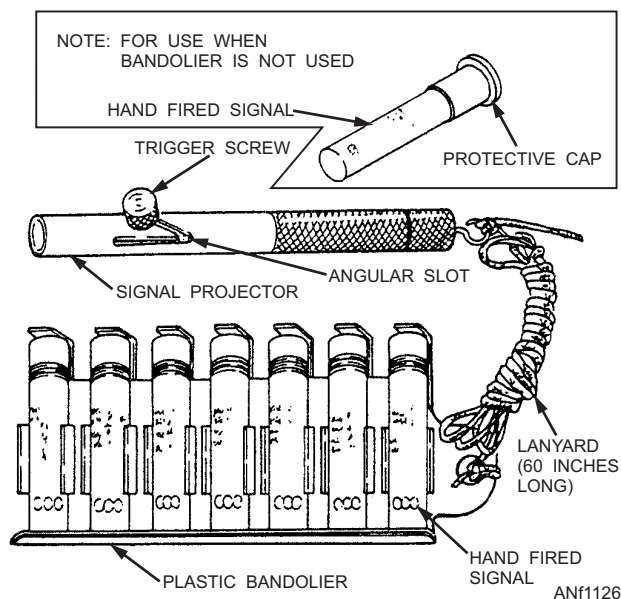


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Figure 11-25.—Individual survival kit.

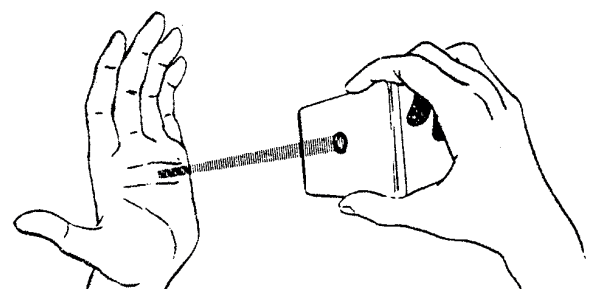
life raft can be sighted at sea. On a clear sunny day, the mirror reflects the equivalent of 8 million candlepower. Flashes from this mirror have been seen from a distance of 40 miles.

Figure 11-27 shows the operation of the signaling mirror. Past experience shows that personnel may have difficulty using the mirror in a bobbing raft at sea.



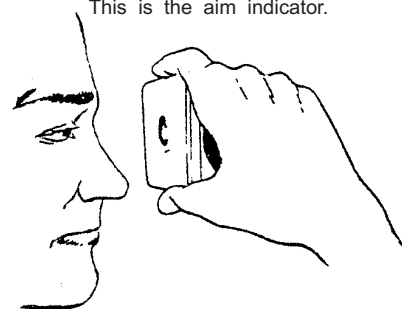
ANf1126

Figure 11-26.—Mk 79 Mod 0 illumination signal kit.



(A) Reflect sunlight from mirror onto a nearby surface. (raft, hand, etc.)

(B) Slowly bring mirror to eye level and look through sighting hole. A bright light spot will be visible. This is the aim indicator.



(C) Hold mirror close to the eye and slowly turn and manipulate it so that the bright light spot is on the target.

ANf1127

Figure 11-27.—Operation of signaling mirror.

Practice signaling with the mirror on the ground is part of a good training program for flight crews. Practice will enhance rescue chances.

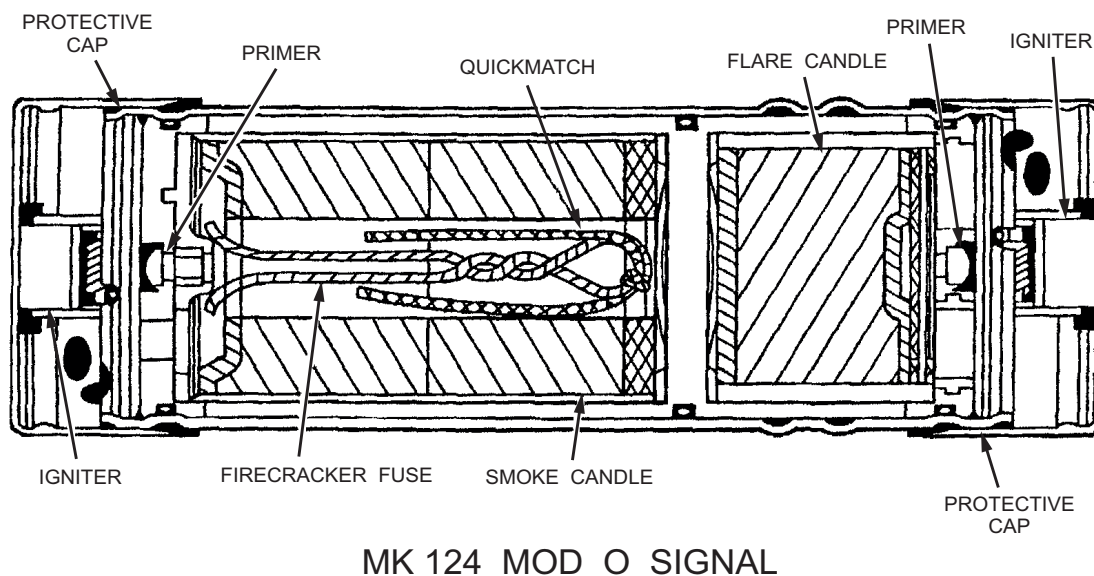
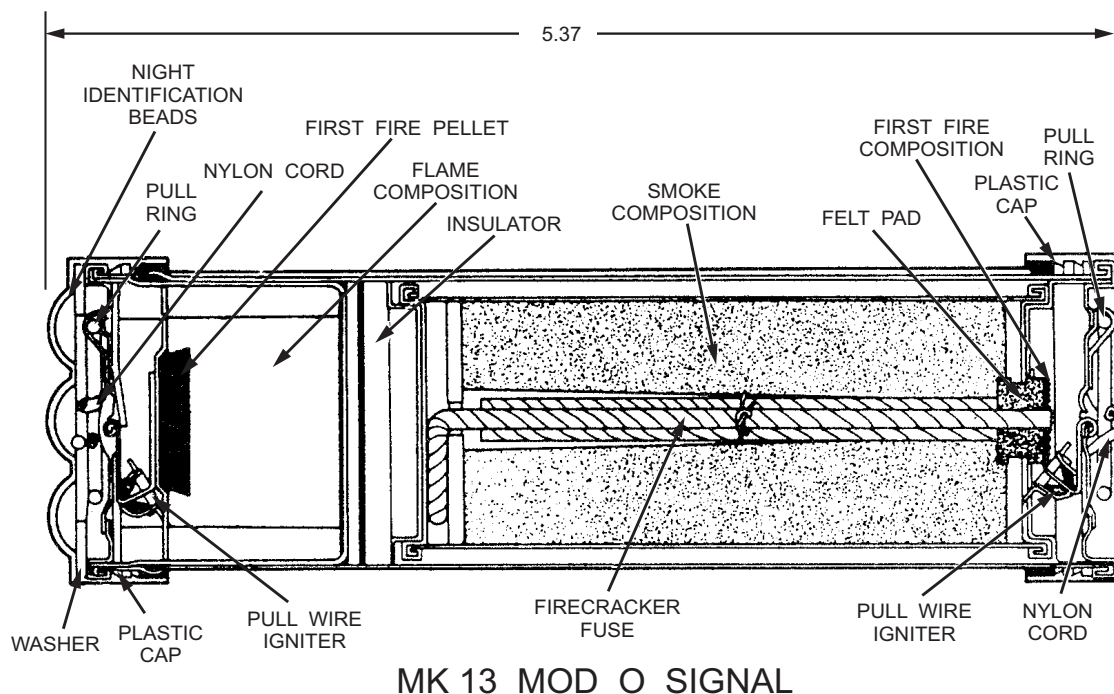
Water Bottle

The water bottle contains 4 ounces of drinking water. Drink this water only to quench an extreme desire for water. Refill the bottle with fresh water every 30 days.

NOTE: When canned water is in the aircraft survival kit, the water bottle may be omitted from the survival kit.

Mk 13 Mod 0 Marine Smoke and Illumination Signal

The Mk 13 signal (fig. 11-28) is used to attract the attention of SAR aircraft and to give pickup aircraft wind drift direction. One end is for night use; the other



ANf1128

Figure 11-28.—Mk 13 and Mk 124 Mod 0 marine smoke and illumination signals.

end is for day use. The night end produces a red flame; the day end produces orange smoke. Each end burns for about 20 seconds. The night end has bumps around its outer edge, approximately one-quarter inch from the end. This identifies it as the night use end. Follow the instructions printed on the signal.

Mk 124 Mod 0 Marine Smoke and Illumination Signal

The Mk 124 Mod 0 marine smoke and illumination signal (fig. 11-28) is also used for either day or night signaling by personnel on land or sea. It is a ONE hand operable device that emits orange smoke for daytime use and red flare for nighttime use. Burning time for each end is about 20 seconds. Each end has protective plastic caps. The night end has two prominent raised bead circles on the casing to positively identify this end, by the sense of touch, for nighttime use. A label on the outer surface around the whole body of the signal further identifies the smoke (day) and flare (night) ends. The label also gives detailed instructions on how to use the signal.

Distress Marker Light (Strobe)

The battery-operated strobe light (fig. 11-29) emits a high-intensity white flashing light 40 to 60 times per minute. The light is visible at great distances and is used to attract the attention of SAR aircraft, ships, or ground rescue parties. It is located in a pouch attached to the personal flight deck inflatable life preserver and other rescue kits. An infrared filter lens and a blue flash guard lens are provided in the individual survival kit for signaling in combat areas.

SURVIVAL RADIOS AND BEACONS

There are several types and models of survival radios and beacons that are carried on personnel, in

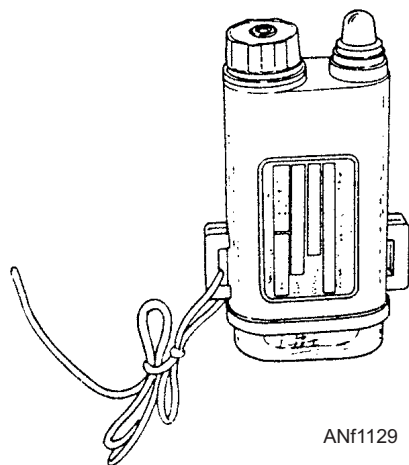


Figure 11-29.—Distress marker light (strobe).

aircraft, or stowed inside life rafts. Radios and beacons are used for different purposes. Radios are used to establish two-way communication, on one or more channels, between aircrew and rescue personnel. Beacons transmit only a swept tone signal for search and rescue (SAR) parties to home in on. Radios and beacons are sometimes combined into one system.

Instructions for use of survival radios and beacons are on instruction plates as part of the equipment.

Q11-14. How many parts are there to the individual survival kit?

Q11-15. How many flares are contained in the Mk 79 Mod 0 Illumination kit?

Q11-16. What hand-held signaling device produces an orange smoke?

RESCUE

LEARNING OBJECTIVE: Identify items of land and sea rescue equipment and their uses.

Land and sea rescue starts when a distress is reported or when a reporting point or arrival time is exceeded. Both military and civilian authorities may react to an emergency. This is called search and rescue (SAR).

Search and rescue craft could be anything from a ship, boat, or fixed-wing aircraft to a fully equipped rescue helicopter with rescue swimmer. The method of searching and rescuing personnel depends on a great many factors, such as location, time, environment, equipment, and personnel. Ditching or bailout often occurs a great distance from a rescue craft. When this happens, military aircraft are diverted or launched to the SAR area.

At sea, fixed-wing aircraft equipped with droppable life raft kits may arrive at the scene and drop a raft to the survivors until the rescue helicopter or surface vessel arrives. The SAR life raft provides communications, medical, and survival items.

RESCUE EQUIPMENT

All naval personnel should be familiar with the equipment used in rescue. The following text discusses rescue equipment and lifting devices that may be used.

Hoisting Cable and Rescue Hook Assembly

The primary rescue device used in helicopter rescue is the hoisting cable and double rescue hook

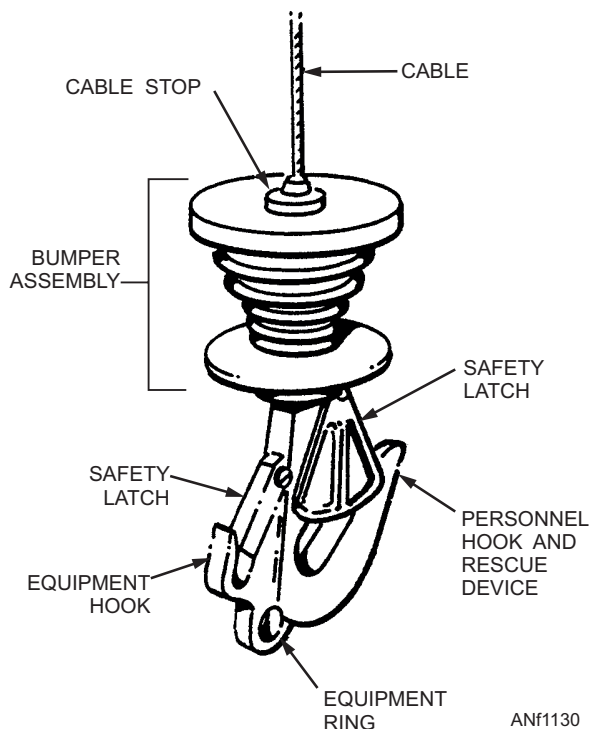


Figure 11-30.—Hoisting cable and rescue hook assembly.

assembly (fig. 11-30). The rescue hook assembly is attached to the end of the helicopter hoisting cable. This hook assembly consists of two gated hooks and an eyelet. The larger hook is used to attach all personnel and/or any elected rescue devices. The smaller hook is used for handling equipment or light cargo. The eyelet is used strictly for cargo hoisting. The upper section of the hook is a ball bearing swivel, which prevents unwinding of the hoisting cable, bumper assembly, and cable stop.

Survivor's Rescue Strop

The survivor's rescue strop (fig. 11-31) (also known as the "horse-collar") is primarily designed as a rescue device for uninjured personnel. It carries one survivor at a time and is connected to the rescue hook assembly. The strop is an inherently buoyant device made of closed cell foam with an orange external cover for high visibility during rescue. A webbing strap running through the cover has a V-ring at both ends for attachment to the double rescue hook. Two black

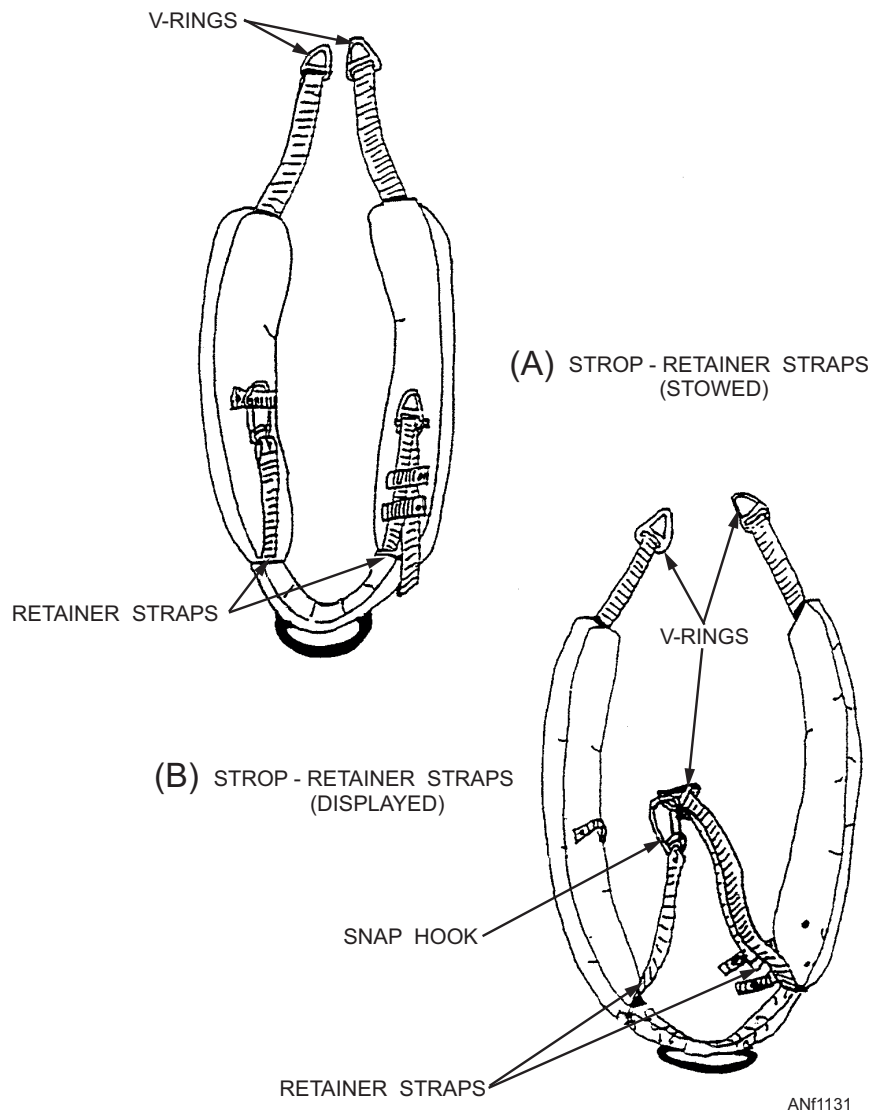


Figure 11-31.—Survivor's rescue strop.

retainer straps are incorporated, one with a snap hook and the other with a V-ring. These straps may be locked around the survivor's body to ensure stability during hoisting.

Forest Penetrator

The forest penetrator (fig. 11-32) may be attached to the rescue hook assembly for land and sea rescue operations. The unit is bright yellow for high visibility. The forest penetrator is 34 inches long and 8 inches in diameter with the three seats retracted. Each seat is approximately 12 inches long and is spring loaded in the retracted position. A spring-loaded retaining latch under each seat secures the seat in the extended position. To release the seat from the extended position, push down on the seat and pull down on the latch. The seat will then snap back into the retracted position. Three webbing safety straps are provided to secure survivors. The straps terminate with a yellow fabric marked **TIGHTEN**. Yellow webbing tabs, marked **PULL OUT**, are sewn to the safety straps and extend from one of three stowage openings.

Attachment of a flotation collar allows the forest penetrator to float during air-sea rescue operations. The collar is made of bright orange foam rubber for high visibility. When the flotation collar is installed, the diameter of the penetrator is 9 inches.

Rescue Net

The rescue net (fig. 11-33) is a collapsible, buoyant device designed to accommodate two survivors. It is constructed of a nylon line woven into a net and aluminum tubular frame. A lifting ring for hoisting is located at the top or upper portion of the net, along with flotation collars and locking support rods. These rods incorporate sliding sleeves to prevent the net from collapsing when it is occupied and to make it easy for storage when not in use.

SAR MEDIVAC Litter

The SAR MEDIVAC litter (fig. 11-34) is designed for use in water, shipboard, mountain, and other re-

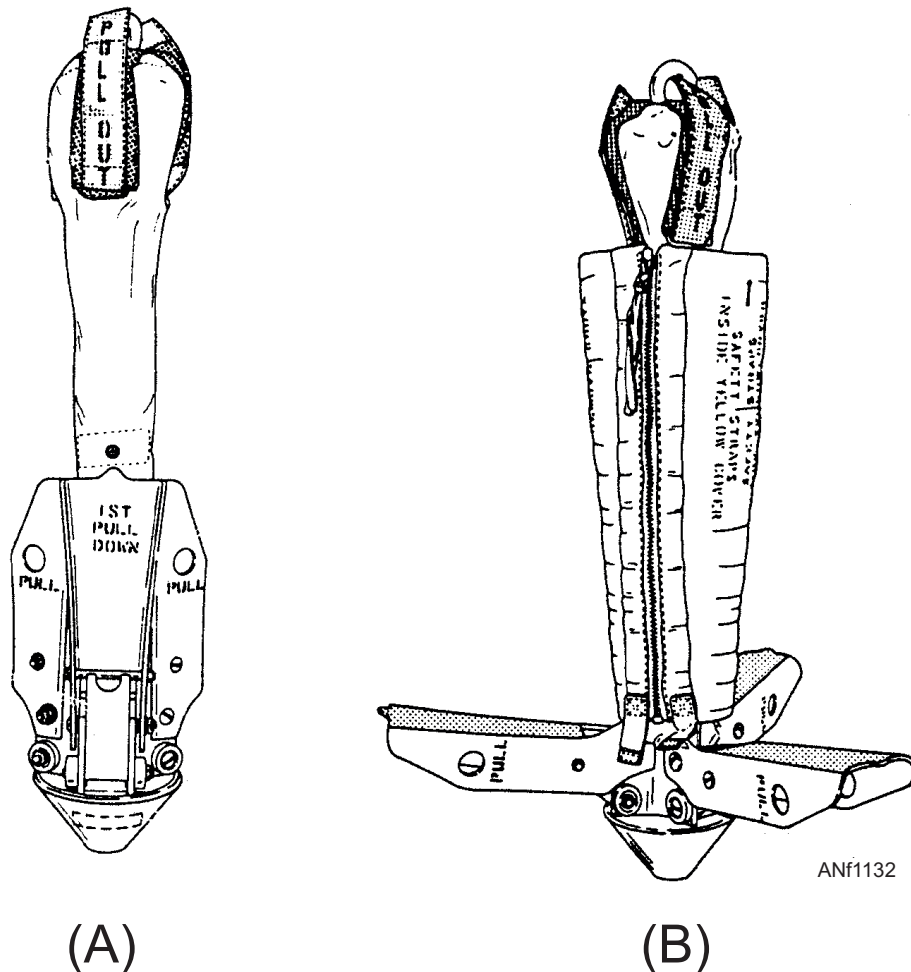


Figure 11-32.—(A) Forest penetrator; (B) Forest penetrator with flotation collar installed.

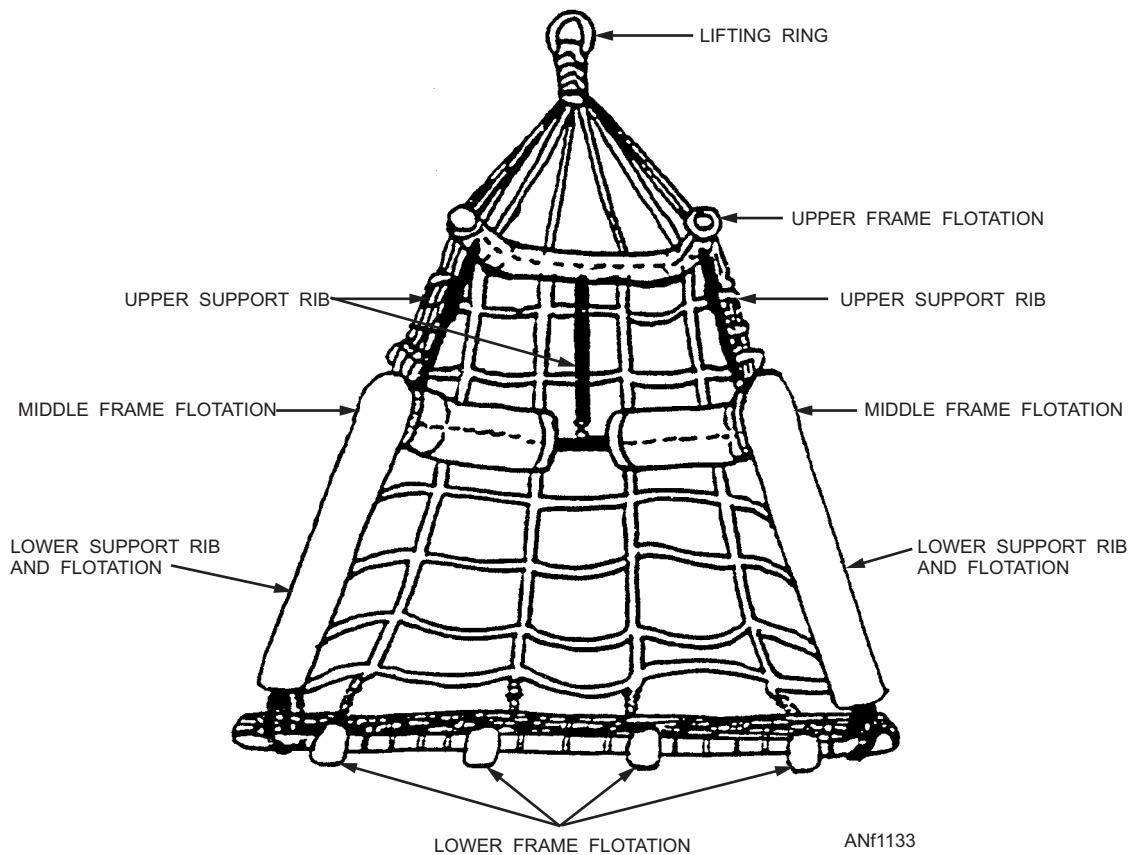


Figure 11-33.—Rescue net.

stricted area rescues. It has a low and narrow profile, floats with the patient's head slightly reclined from the vertical, and can be hoisted vertically with its own slings or horizontally by using standard rescue litter slings (cables) and a trail line assembly. The litter folds in half and is constructed of stainless steel tubing, the case and bed of nylon ballistic cloth, the restraint straps of nylon webbing and (Velcro), and the zippers are heavy duty and noncorrosive. It weighs approximately 40 pounds when fully rigged.

SEA RESCUE

Sea rescue operations require preparation and practice for success. Survivors should take the following actions to aid rescuers:

1. Remove your parachute and get clear of it.
2. Retain your helmet for protection during hoisting operations.
3. Establish communications by using the survival radio. If radio is not available, use signaling devices.
4. Use a Mk 13 or MK 124 Mod 0 smoke signal to show direction of surface winds.

5. During night rescue, turn on the strobe or steady burning signal light.

6. If in a life raft, deploy the sea anchor, and then get clear of the life raft.

7. Ensure that the rescue device is in the water before you touch it. Static electricity may have built up.

For sea rescues, a SAR crewman will be placed into the water. The SAR crewman will take control of the rescue and attach the survivor(s) to the elected rescue device for hoisting.

Q11-17. What does SAR mean?

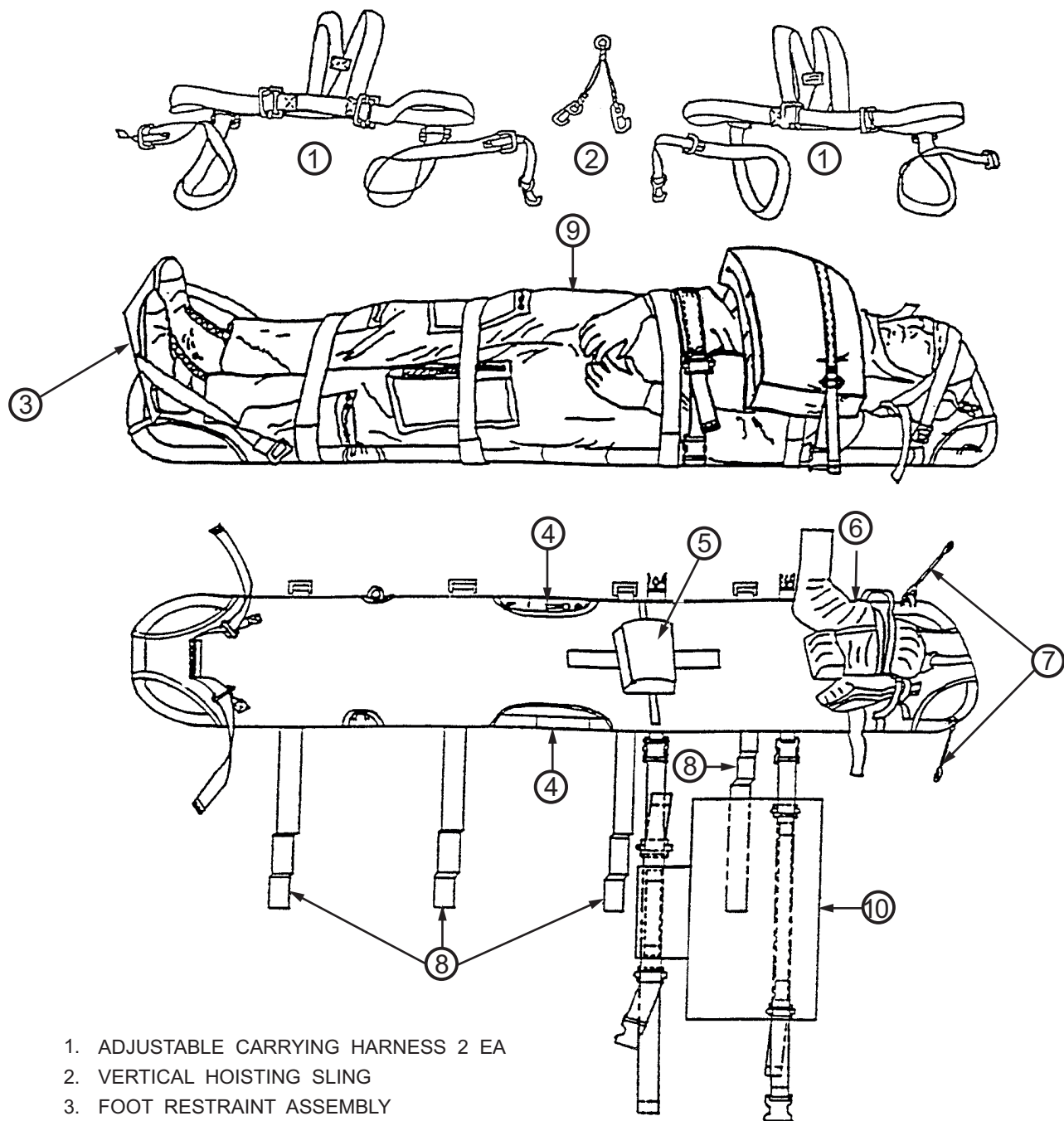
Q11-18. What is the primary rescue device used in helicopter rescues?

Q11-19. How many seats are on the forest penetrator?

Q11-20. How many survivors is the rescue net designed for?

SUMMARY

In this chapter you have identified aircrew survival equipment, flight clothing, parachutes, life preservers, life rafts, personal survival equipment, rescue procedures, and equipment.



1. ADJUSTABLE CARRYING HARNESS 2 EA
2. VERTICAL HOISTING SLING
3. FOOT RESTRAINT ASSEMBLY
4. LOCKING COUPLERS
5. LUMBAR SUPPORT PAD
6. HEAD RESTRAINT
7. HOISTING CONNECTING CABLE
8. PATIENT STRAPS
9. PATIENT IN LITTER
10. CHEST FLOTATION

ANf1134

Figure 11-34.—SAR MEDIVAC litter.

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ASSIGNMENT 11

Textbook Assignment: "Aircrew Survival Equipment," chapter 11, pages 11-1 through 11-25.

- 11-1. The personnel that rig, pack, and inspect survival equipment are commonly called Parachute Riggers. What is the correct title for this rating?
1. Aircrew Survival Equipmentman (PR)
 2. Survival Riggers
 3. Ejection and Survival Technicians
 4. Aircrew Support Technicians
- 11-2. Personnel responsible for survival training are assigned to what organization?
1. In the parachute loft
 2. In air operations
 3. In Flight Physiology
 4. In the supply department
- 11-3. The pressure chamber allows you to use oxygen equipment under the atmospheric pressure conditions encountered at high altitudes, and to see how your body reacts to those changes.
1. True
 2. False
- 11-4. Which of the following is a design feature of the flight clothing used in naval aviation?
1. Fire protection
 2. Camouflage
 3. Escape and evasion
 4. Each of the above
- 11-5. Summer flying coveralls are fabricated from which of the following types of material?
1. Cotton
 2. Aramid cloth (Nomex)
 3. Polyester
 4. Rayon
- 11-6. The fabric used in the manufacture of flight coveralls does NOT burn, but will begin to char at what temperature?
1. 300° to 400°F
 2. 500° to 600°F
 3. 700° to 800°F
 4. 900° to 1,000°F
- 11-7. Flight gloves are manufactured from which of the following types of materials?
1. Soft leather only
 2. Nomex fabric only
 3. Soft leather and Aramid (Nomex) fabric
 4. Nylon twill
- 11-8. What person is responsible for the upkeep of a pilots helmet?
1. Aircrew Survival Equipmentman
 2. The pilot
 3. Plane captain
 4. AME
- 11-9. What series helmet is designed for all tactical fixed-wing aircraft?
1. HGU-84/P
 2. PPH-11/S
 3. HGU-68(V)/P
 4. APH-23/V
- 11-10. What series helmet is designed for all helicopter aircrew members?
1. HGU-84/P
 2. PPH-11/S
 3. HGU-68(V)/P
 4. APH-23/V
- 11-11. How many sizes are available for the HGU-84/P flight helmet?
1. One
 2. Two
 3. Three
 4. Four
- 11-12. What type of protection is available to the aircrewman for excessive "g" forces?
1. Anti-blackout suit
 2. Anti-g coveralls
 3. Pressurized cabins
 4. Full pressure suit
- 11-13. How many different models of anti-g suits are used by the Navy?
1. One
 2. Two
 3. Three
 4. Four

- 11-14. Which of the following symptoms does a person experience due to excessive "g" forces?
1. Blacking out
 2. Loss of vision
 3. Lower mental efficiency
 4. Each of the above
- 11-15. What "g" range can an aircrewman withstand without anti-g protection?
1. 2.2 to 4.2 g's
 2. 4.5 to 5.5 g's
 3. 6.0 to 7.0 g's
 4. 8.0 to 9.0 g's
- 11-16. The quick donning antiexposure suit comes equipped with which of the following parts?
1. Boots
 2. Hood
 3. Mittens
 4. Each of the above
- 11-17. Antiexposure suits are required when personnel are exposed to which of the following conditions?
1. When the water temperature is 50°F or below
 2. When the outside air temperature (OAT) is 32°F (wind chill factor corrected) or below
 3. Both 1 and 2 above
 4. When the sum of the air and water temperatures exceeds 85°F
- 11-18. When water temperature is between 50° and 60°F, what person determines whether an antiexposure suit will be worn?
1. The aircraft commander
 2. The commanding officer
 3. The maintenance officer
 4. The individual
- 11-19. A personnel parachute consists of how many major parts?
1. Three
 2. Four
 3. Five
 4. Six
- 11-20. How many basic types of parachutes are used by the Navy?
1. One
 2. Two
 3. Three
 4. Four
- 11-21. Which of the three basic types of Navy parachutes is used in ejection seat aircraft?
1. NES
 2. NC
 3. NB
- 11-22. What size canopy is used in the NES type parachute?
1. 12 foot
 2. 24 foot
 3. 28 foot
 4. 32 foot
- 11-23. Upon pilot ejection, how many methods are there for deploying the parachute?
1. One
 2. Two
 3. Three
 4. Four
- 11-24. Which of the following parachute parts pull(s) the main canopy from the container upon ejection?
1. The suspension lines
 2. The automatic opening device
 3. The ripcord pins
 4. The pilot chute
- 11-25. What total number of projectiles are installed on a spreading gun?
1. 10
 2. 12
 3. 14
 4. 16
- 11-26. Which of the following parachute harnesses is used with the NES type parachute?
1. Integrated torso
 2. Back pack
 3. Quick fit
 4. Chest pack
- 11-27. What are the two types of quick-fit harnesses?
1. Torso and back types
 2. Chest and back types
 3. Quick-fit type 1 and quick-fit type 2
 4. Standard and chest types
- 11-28. What is the purpose of the gated "D" ring used on the integrated torso harness?
1. To attach a helicopter rescue hook
 2. To secure to the life raft
 3. To attach to another survivor
 4. To attach to a survival kit

- 11-29. What components connect the parachute canopy to the parachute harness?
1. Parachute containers
 2. Integrated torso harnesses
 3. Rip cord pins
 4. Suspension lines
- 11-30. What total number of sections make up a gore on a parachute canopy?
1. One
 2. Two
 3. Three
 4. Four
- 11-31. How is each gore section of a parachute canopy identified?
1. By colors
 2. By numbers
 3. By letters
 4. By size
- 11-32. Most parachute canopies are manufactured in different colors. What total number of colors are used?
1. Two
 2. Three
 3. Four
 4. Five
- 11-33. Which of the following precautions is a proper handling procedure for a parachute?
1. Do not carry a parachute by its ripcord handle or lift webs
 2. Keep a parachute dry and away from all sources of moisture
 3. Do not drop a parachute
 4. Each of the above
- 11-34. Acids of any kind, even in weak solutions, are extremely harmful to parachute fabrics.
1. True
 2. False
- 11-35. Personnel life preservers are rapidly inflated by what means?
1. CO₂ cartridge
 2. Oral inflation tube
 3. Pneumatic canister
 4. Nitrogen hose
- 11-36. How is the distress signal light activated on the LPP series life preserver?
1. A toggle switch
 2. By water
 3. A connector wire
 4. The "pull" lanyard
- 11-37. Dye markers will be a good target up to what maximum amount of time?
1. 20 minutes
 2. 30 minutes
 3. 45 minutes
 4. 60 minutes
- 11-38. A dye marker can be seen by an aircrewman in an aircraft flying at 3,000 feet for what approximate distance?
1. 11 miles
 2. 22 miles
 3. 7 miles
 4. 18 miles
- 11-39. What type of life preserver is designed for constant-wear and attaches to the SV-2 series survival vest?
1. LPP
 2. LPU
 3. LPA
- 11-40. What is the purpose of the "D" ring on the life preserver unit (LPU) waist lobe?
1. Attach to the helicopter rescue hook
 2. To secure the waist lobes together
 3. To attach the life raft to the survivor
 4. To secure the survival kit
- 11-41. Which of the following is NOT a piece of aviation survival equipment?
1. LPU life preserver
 2. LPP life preserver
 3. Flight deck inflatable life preserver
 4. Each of the above
- 11-42. By what means is overinflation prevented on the flight deck inflatable life preserver?
1. A pressure-relief valve diaphragm
 2. An oral inflation tube check valve
 3. A metered orifice in the CO₂ cylinder
 4. A pressure sensitive blow-out plug

- 11-43. How many pounds of buoyancy does the bladder support on the flight deck life preserver?
1. 15 pounds
 2. 21 pounds
 3. 29 pounds
 4. 37 pounds
- 11-44. The outer garment of the flight deck inflatable life preserver is available in a variety of colors used to identify the carrier/flight deck personnel occupational fields.
1. True
 2. False
- 11-45. Where would you find the maintenance and inspection requirements for the flight deck inflatable life preserver?
1. The squadron paraloft maintenance publication
 2. The shipboard Planned Maintenance System
 3. The AME work center
 4. The quality assurance work center
- 11-46. Naval aircraft that make operational flights over water are required to carry enough life rafts to carry all the assigned crew plus passengers.
1. True
 2. False
- 11-47. Which of the following methods is used to automatically inflate the one-man life raft contained in the RSSK?
1. The lap belt retention assembly inflates the life raft
 2. The drop lanyard will inflate the raft upon separation from the RSSK
 3. The life raft will inflate upon contact with salt water
- 11-48. Which of the following items are contained in the rigid seat survival kit (RSSK) in a parachute/ejection seat egress system?
1. Emergency oxygen system
 2. One-man life raft
 3. Survival equipment container
 4. Each of the above
- 11-49. Multiplace life rafts are manufactured in how many different sizes?
1. Four
 2. Five
 3. Six
 4. Seven
- 11-50. Multiplace life rafts are equipped with provisions to support 4, 7, 12, or 20 people for how many hours?
1. 8 hours
 2. 12 hours
 3. 24 hours
 4. 36 hours
- 11-51. Which of the following types of life rafts is equipped with boarding ramps?
1. 4-man life raft
 2. 7-man life raft
 3. 12-man life raft
 4. 20-man life raft
- 11-52. What is a unique design feature of the 20-man life raft?
1. The shape and color of the raft
 2. Its floating characteristics in rough seas
 3. It is always right-side-up after inflation
 4. It is virtually unsinkable
- 11-53. What is the length of the sheath knife carried by the aircrewman while wearing the SV-2 series survival vest?
1. 4 inches
 2. 5 inches
 3. 6 inches
 4. 7 inches
- 11-54. What are the two parts of the individual survival kit contained in the SV-2 series survival vest?
1. Emergency and all-purpose
 2. Survival and evasion packets
 3. Land and sea packets
 4. Medical and general survival equipment
- 11-55. How many Mk 80 star flare cartridges are contained in the Mk 79 Mod 0 illumination signal kit?
1. Five
 2. Six
 3. Seven
 4. Eight

- 11-56. A Mk 80 star flare cartridge has a minimum burn duration of 4 1/2 seconds and can be launched up to how many feet?
1. 100 feet
 2. 250 feet
 3. 300 feet
 4. 450 feet
- 11-57. Flashes from a signaling mirror can be seen up to what total number of miles?
1. 10 miles
 2. 20 miles
 3. 40 miles
 4. 50 miles
- 11-58. The water bottle carried by the aircrewman will hold what total number of ounces of water?
1. 4 ounces
 2. 6 ounces
 3. 10 ounces
 4. 16 ounces
- 11-59. What color is the smoke that is emitted from the day end of the Mk 124 Mod 0 marine smoke and illumination signal?
1. White
 2. Orange
 3. Red
 4. Green
- 11-60. What is the approximate burning time of each end of the Mk 124 Mod 0 marine smoke and illumination signal?
1. 20 seconds
 2. 30 seconds
 3. 45 seconds
 4. 60 seconds
- 11-61. How is the night end of the Mk 124 Mod 0 marine smoke and illumination signal identified?
1. Two prominent raised beads
 2. A large washer with pull lanyard
 3. The label under the end cap
 4. Each of the above
- 11-62. The battery operated distress marker strobe light emits a high-intensity white flashing light approximately how many times per minute?
1. 30 to 50 times
 2. 40 to 60 times
 3. 70 to 90 times
 4. 100 to 120 times
- 11-63. Radios are used to establish two-way communication, on one or more channels, between aircrew and rescue personnel.
1. True
 2. False
- 11-64. What are some of the factors to consider when searching for and rescuing personnel?
1. The location and time
 2. The environment
 3. Equipment and personnel
 4. All of the above
- 11-65. What is the primary rescue device used in helicopter rescues?
1. The hoisting cable and double rescue hook
 2. The survivor's rescue strop
 3. The SAR medivac litter
 4. The forest penetrator with floatation
- 11-66. What is the purpose of the small hook on the double rescue hook?
1. For hoisting personnel
 2. Attachment of a rescue device
 3. Secure medivac litter to the aircraft
 4. Handling light cargo
- 11-67. What is the survivor's rescue strop commonly called?
1. Lifting sling
 2. Horse collar
 3. Hoisting strap
 4. Rescue ring
- 11-68. How many "V" rings are incorporated on the survivor's rescue strop?
1. One
 2. Two
 3. Three
 4. Four
- 11-69. The forest penetrator can be used for land and sea rescue operations.
1. True
 2. False
- 11-70. How many safety straps are incorporated on the forest penetrator?
1. One
 2. Two
 3. Three
 4. Four

11-71. The rescue net is designed to accommodate what total number of survivors?

1. One
2. Two
3. Three
4. Four

11-72. What is the approximate weight of a fully rigged SAR medivac litter?

1. 120 pounds
2. 85 pounds
3. 40 pounds
4. 100 pounds